Equipment Engineer Technica	Specification: EE&QA-886	
OCS Inspection Car Consist Pro	Dogg	
Appendix H: Book of Standard Tra	Page: -	
Date: December 19, 2017	Revised: November 25, 2020	Revision: 2.0

Appendix H

Book of Standard Trackwork Plans



MAINTENANCE OF WAY DIVISION

BOOK OF STANDARD TRACKWORK PLANS

M.O.W. DIVISION

BOOK OF STANDARD TRACKWORK PLANS

Index Date: June 2001

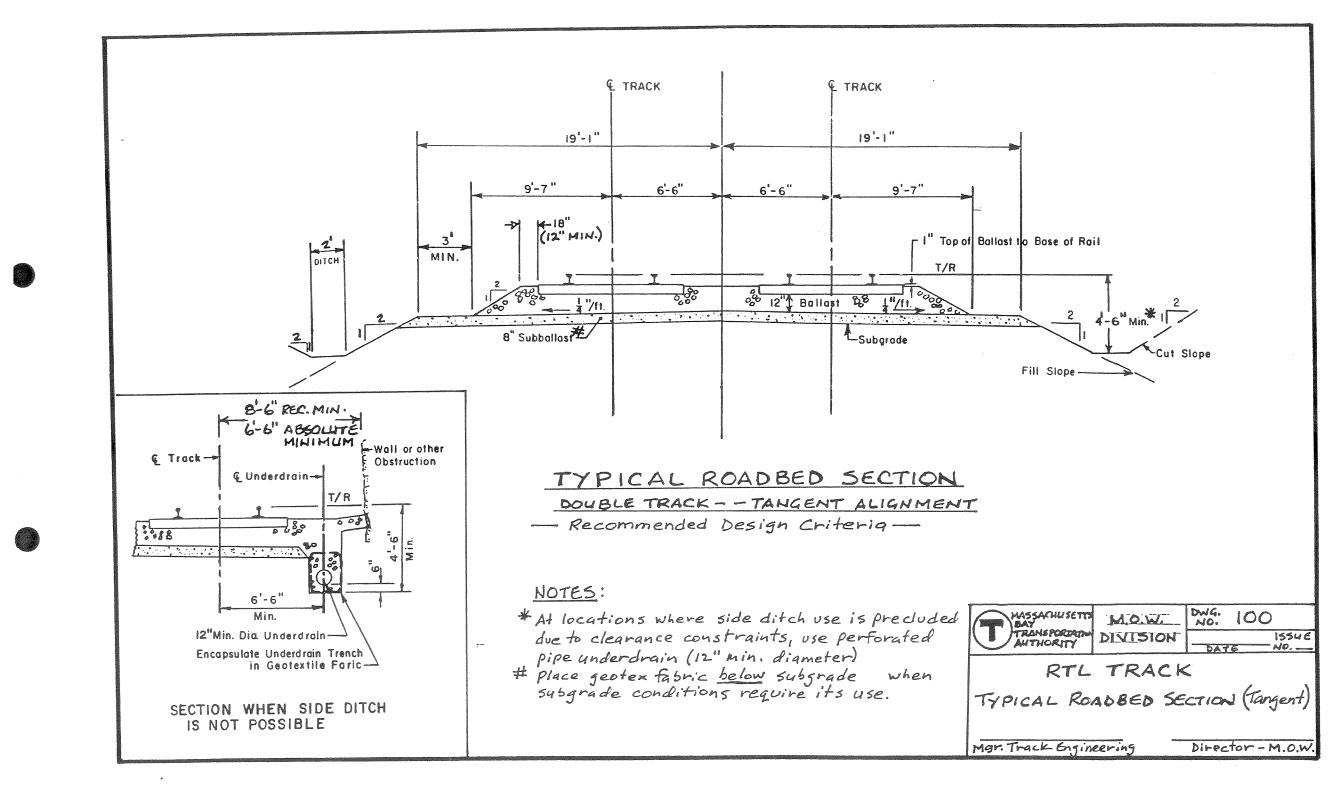
Plan Index

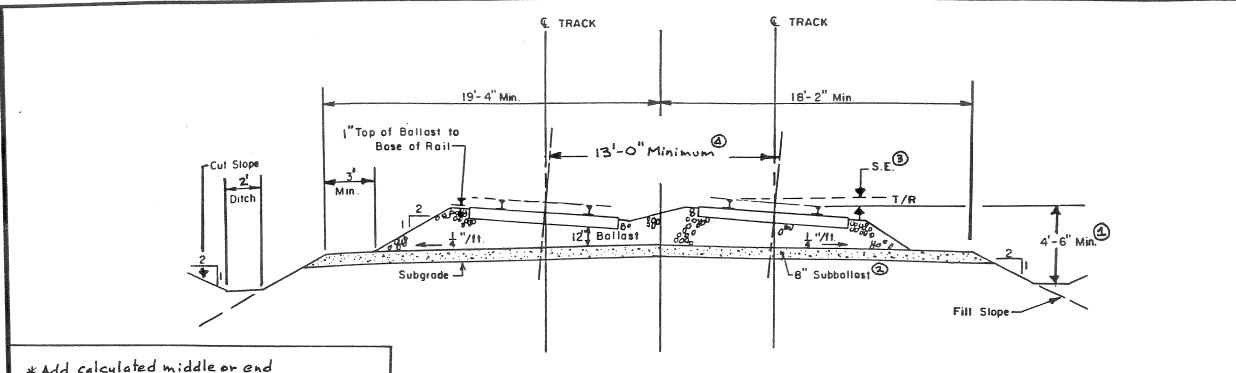
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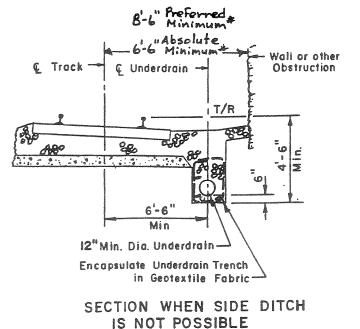
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* Add calculated middle or end everhans to minimum dimensions.



TYPICAL ROADBED SECTION

DOUBLE TRACK -- CURVED ALIGNMENT

- Recommended Design Criteria -

HOTES:

1) At locations where side ditch use is precluded due to clearance constraints, use perforated pipe underdrain (12" minimum diameter).

3 Place geotex fabric below subballast when

Subgrade conditions require its use.

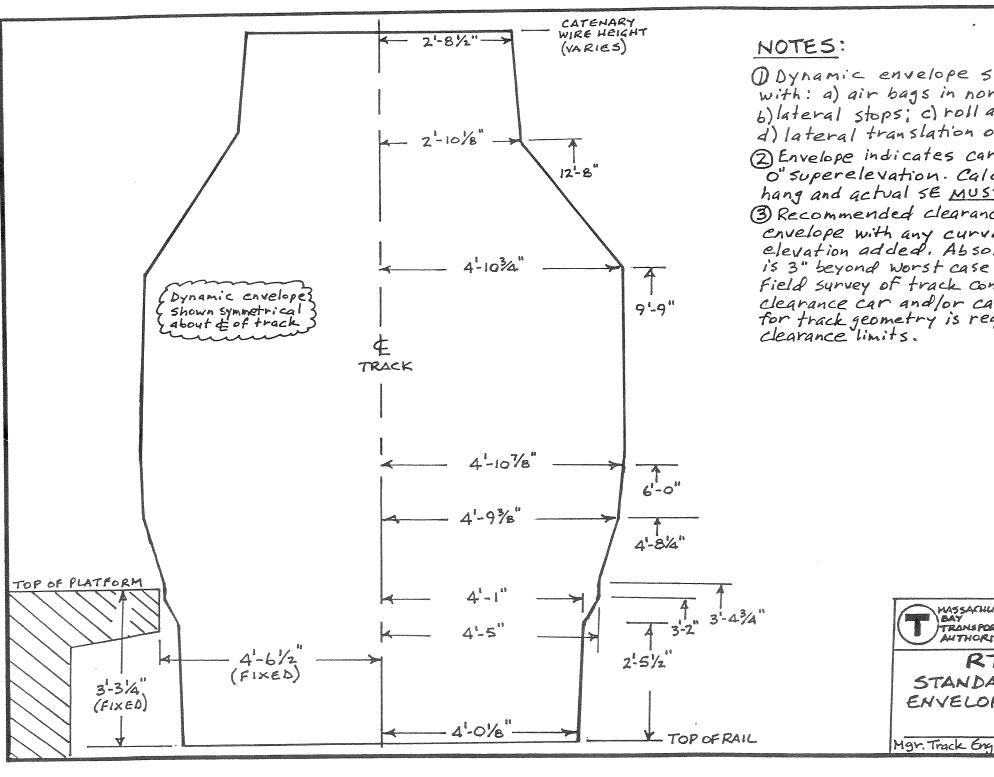
3 If outer track has greater superelevation than Inner track, increase track centers 3.5" for each I" of additional SE.

@ Add calculated middle and end overhangs for applicable curvature and equipment to minimum".

MASSACHUSETTS BAY TRANSPORTATION	M.O.W.	No: 105
AUTHORITY	DIAIDION	DATE NO.

RTL TRACK TYPICAL ROADBED SECTION (CURVE)

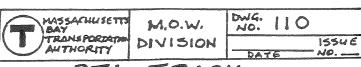
Mgr. Track Engineering



ODYNAMIC envelope shown for loaded car with: a) air bags in normal operating condition; b) lateral stops; c) roll angle at body = 3°-1'; d) lateral translation of truck = 1/8".

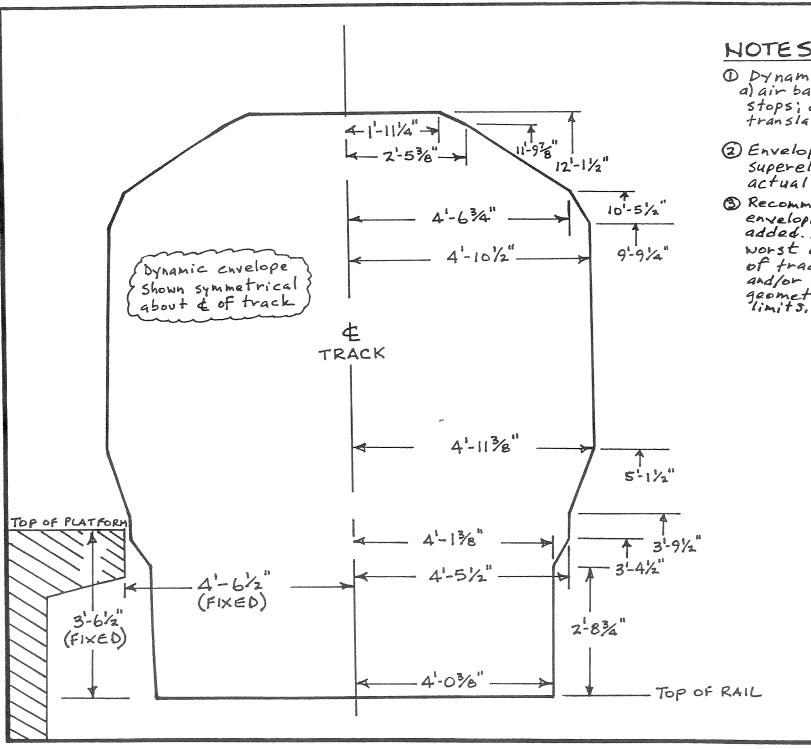
2 Envelope indicates car on tangent track with O" superelevation. Calculated can body overhang and actual SE MUST BE CONSIDERED.

(3) Recommended clearance is 6" beyond dynamic envelope with any curvature and/or superelevation added. Absolute minimum clearance is 3" beyond worst case dynamic envelope of car. field survey of track conditions and use of clearance car and/or car body template adjusted for track geometry is required to confirm actual clearance limits.



TRACK RTL STANDARD DYNAMIC CLEARANCE ENVELOPE - BLUE LINE #4 CAR

Mgr. Track Engineering



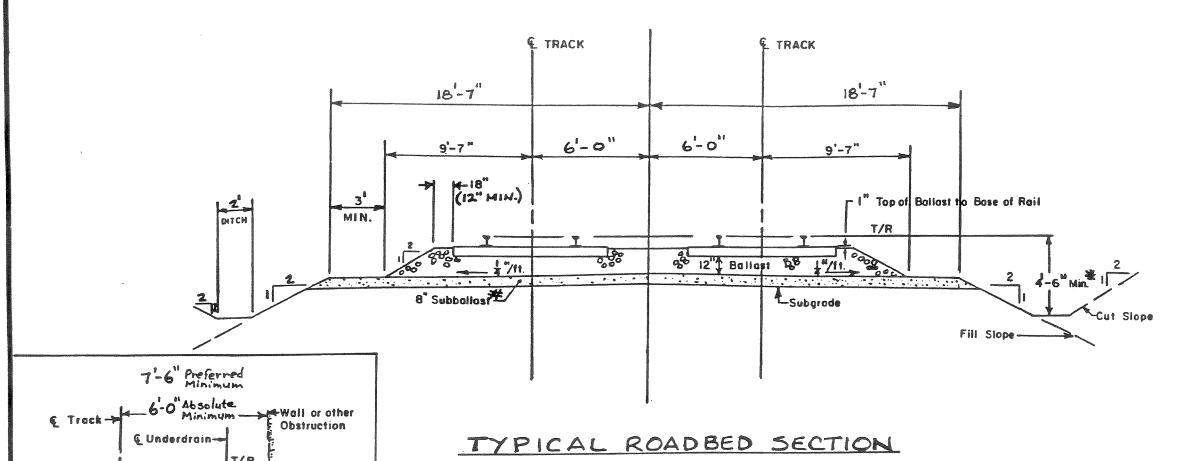
HOTES:

- 1 Dynamic envelope shown for loaded can with: a) air bags in normal operating condition; b) lateral stops; c) roll angle at body = 3°-25'; d) lateral translation of truck = 1/4".
- 2 Envelope indicates can on tangent track with o" Superelevation. Calculated car body overhang and actual SE MUST BE CONSIDERED.
- 3 Recommended clearance is 6" beyond dynamic envelope with any curvature and/or superelevation added. Absolute minimum clearance is 3" beyond worst case dynamic envelope of car. Field survey of track conditions and use of clearance can and/or car body template adjusted for track-geometry is required to confirm actual clearance limits.



RTL TRACK STANDARD DYNAMIC CLEARANCE ENVELOPE-ORANGE LINE "12 CAR

Mgr. Track Engineening



DOUBLE TRACK - - TANGENT ALIGNMENT

- Recommended Design Criteria -

NOTES:

- L 30

12"Min. Dia Underdrain

IS NOT POSSIBLE

Encapsulate Underdrain Trench

SECTION WHEN SIDE DITCH

in Geotextile Foric-

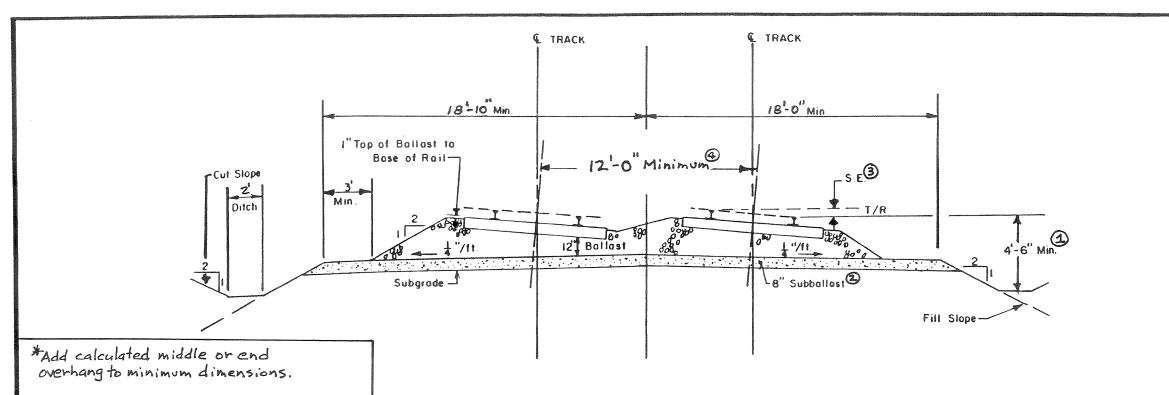
8688

- * At locations where side ditch use is precluded due to clearance constraints, use perforated pipe underdrain (12" min. diameter).
- pipe underdrain (12" min. diameter). # place geotex fabric below subballast when subgrade conditions require its use.

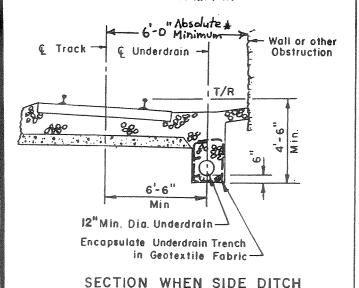


LRT TRACK
TYPICAL ROADBED SECTION (Tangent)

Mar. Track Engineering



7-6" Proferred &

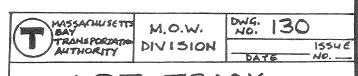


IS NOT POSSIBLE

TYPICAL ROADBED SECTION DOUBLE TRACK -- CURVED ALIGNMENT - Recommended Design Criteria -

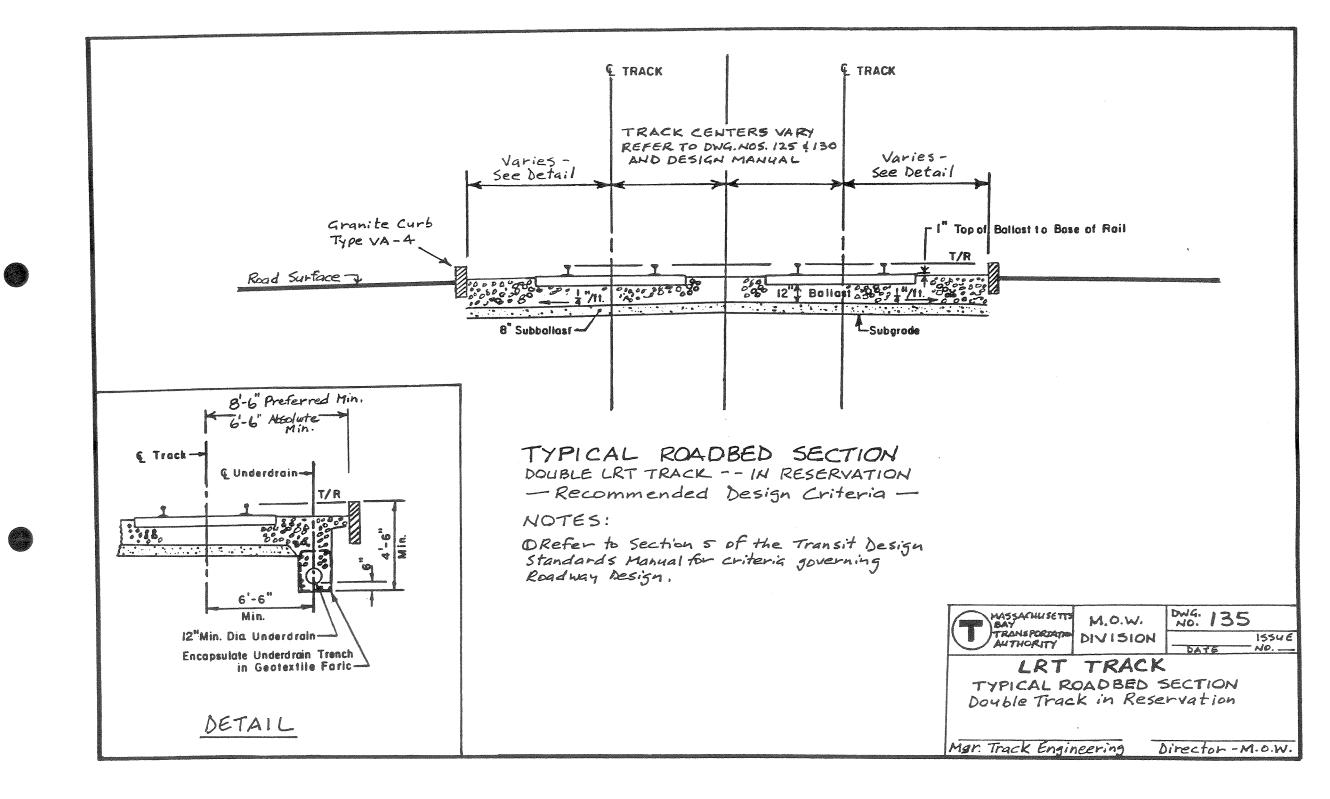
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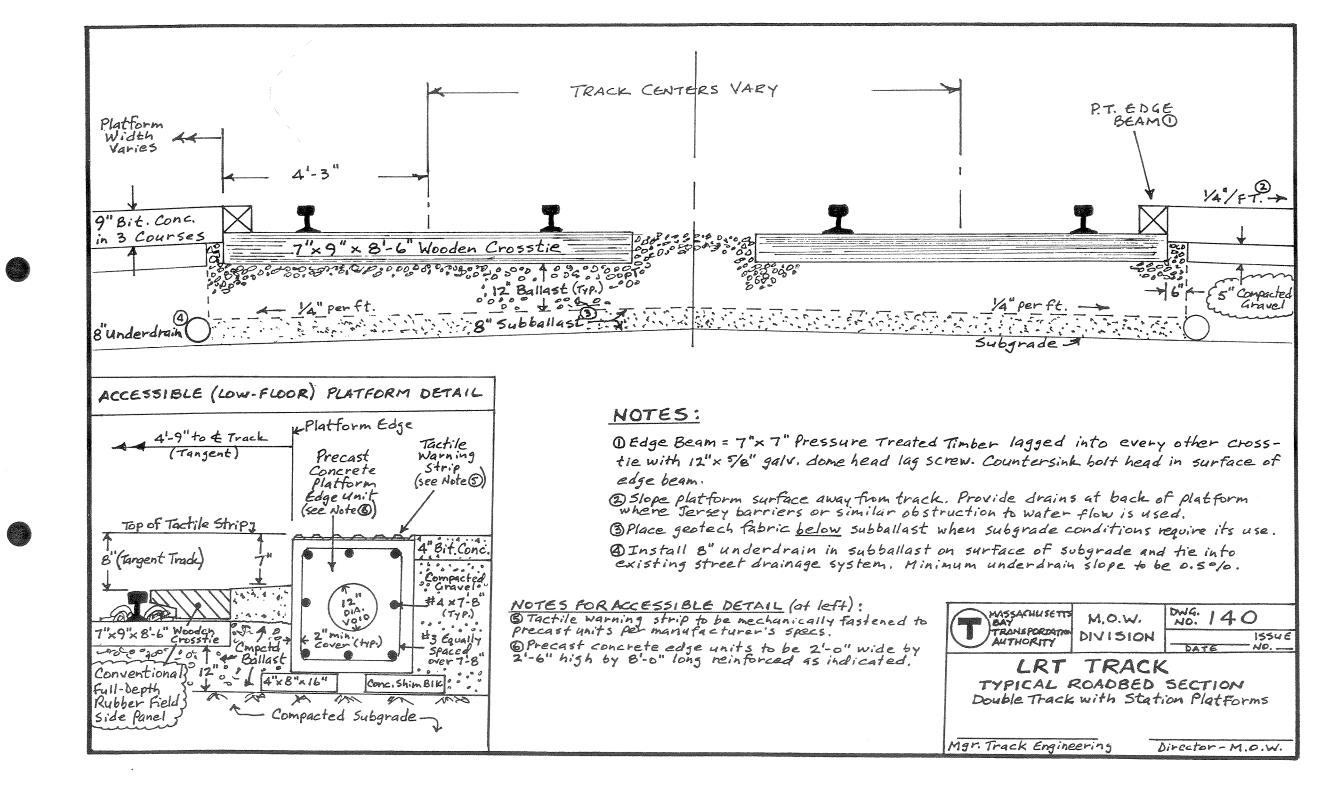
- DAt locations where side ditch use is precluded due to clearance constraints, use perforated pipe underdrain (12" minimum diameter).
- Oplace geotex fabric below subballast when subgrade conditions require its use.
- 3 If outer track has greater superelevation than inner track, increase track centers 3.5" for each 1" of additional SE.
- DAdd calculated middle and end overhangs for applicable curvature and equipment to "minimum".

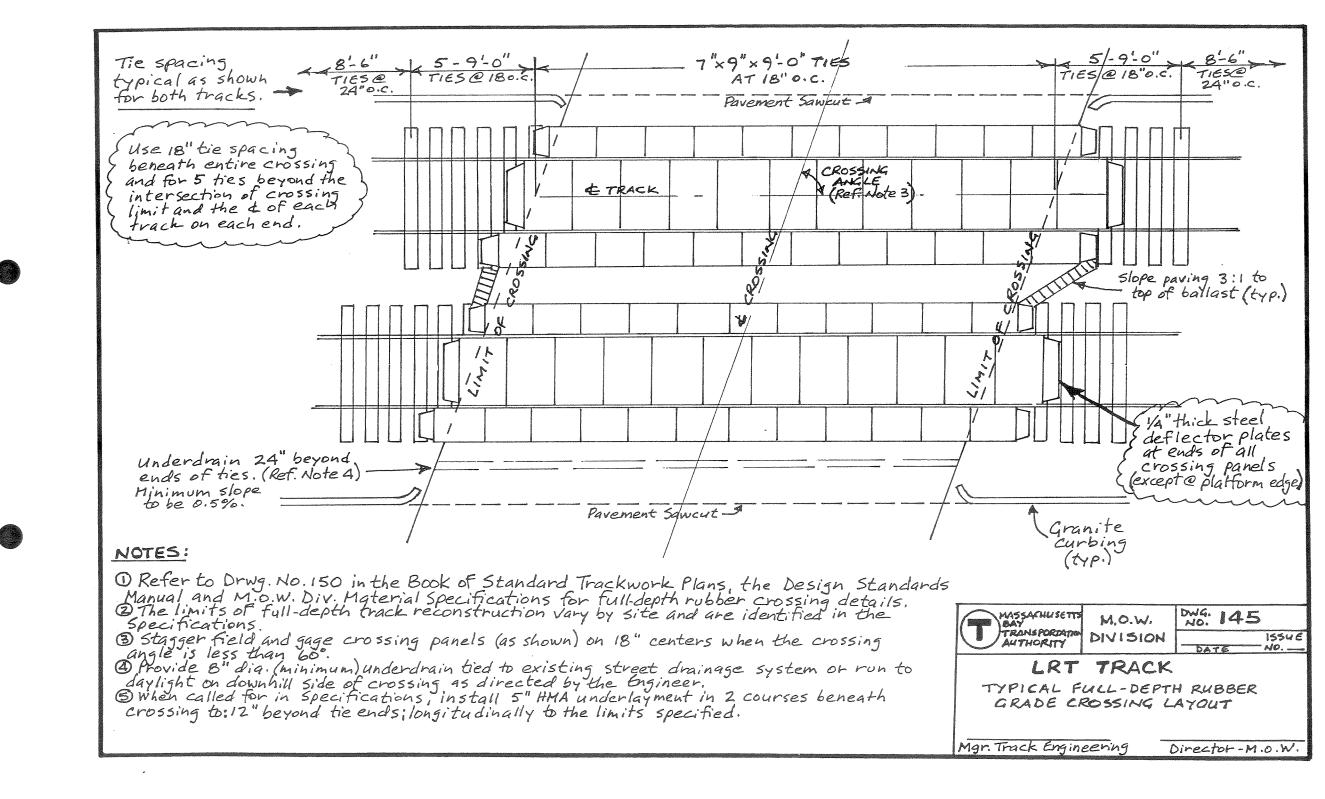


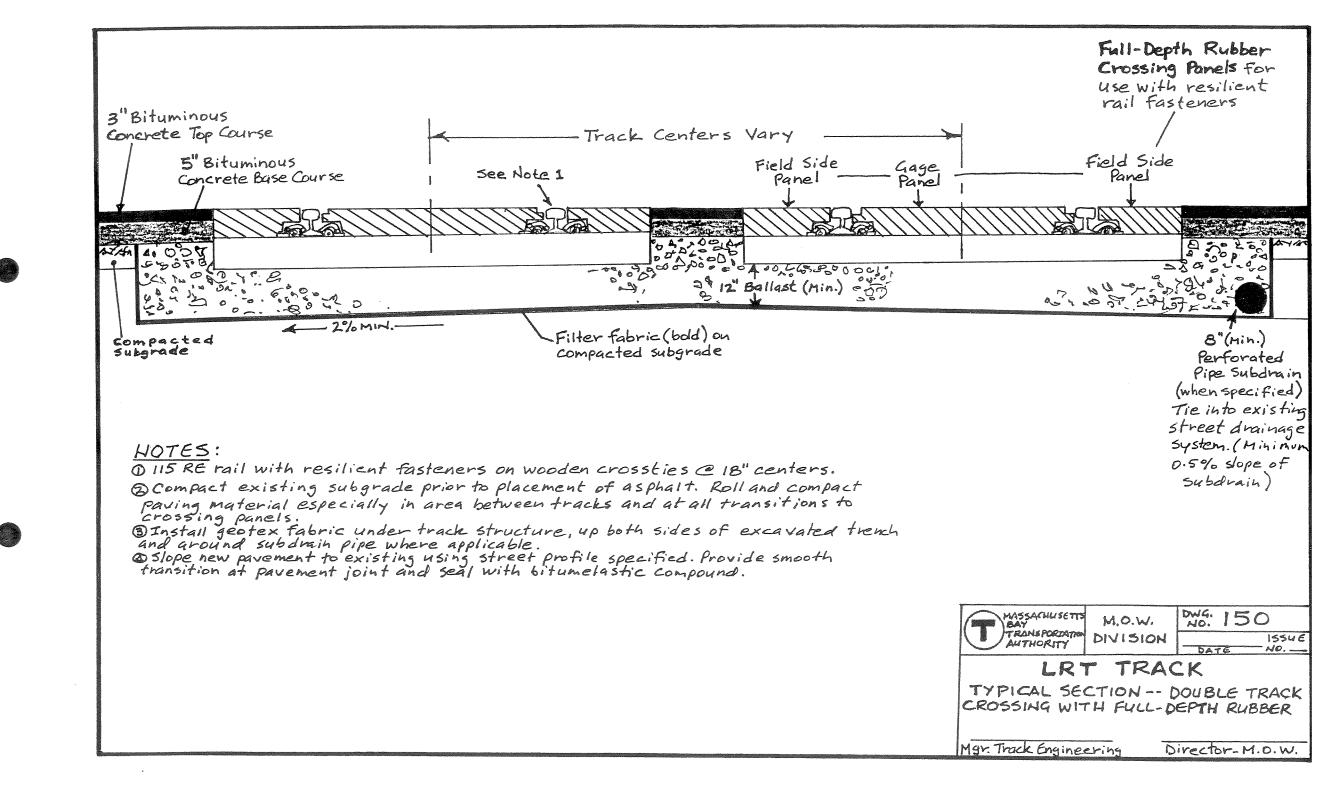
LRT TRACK
TYPICAL ROADBED SECTION
(CURVE)

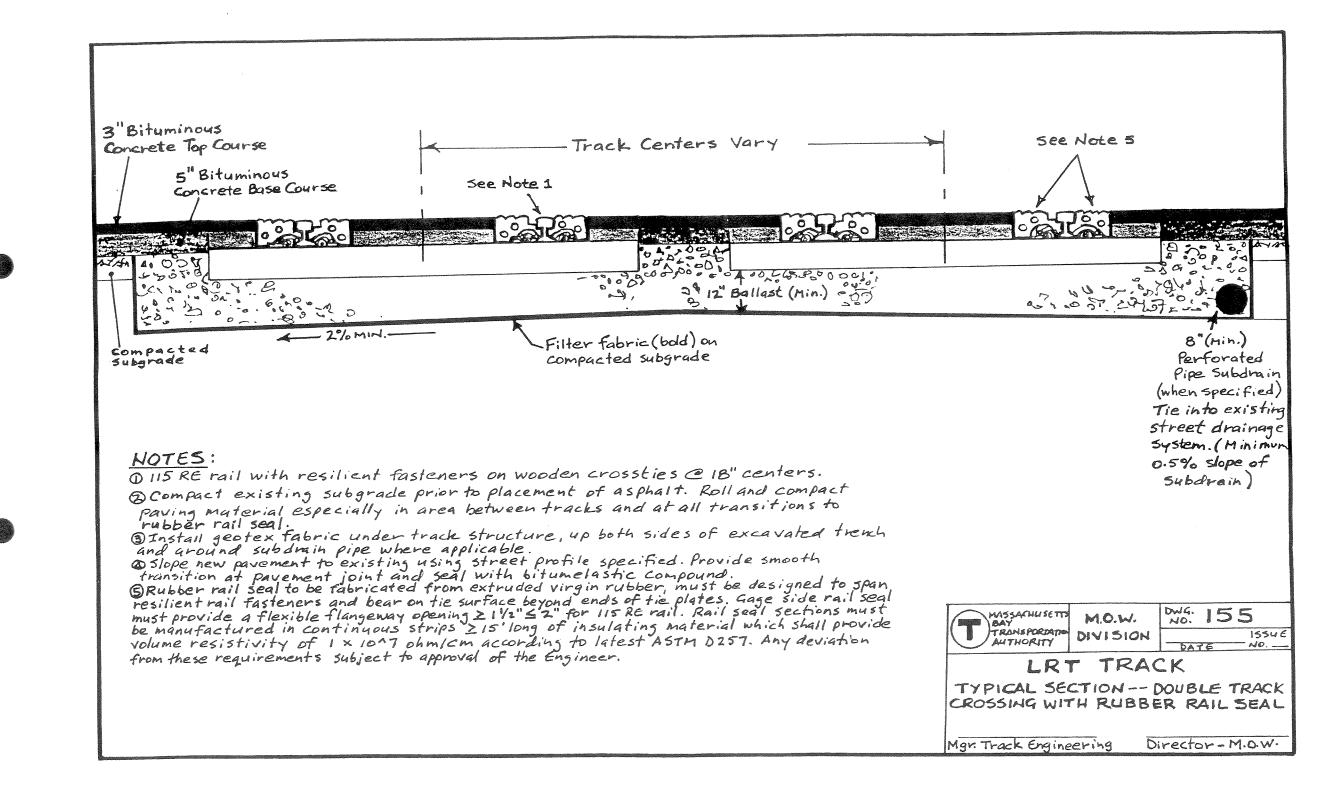
Mgr. Track Engineering

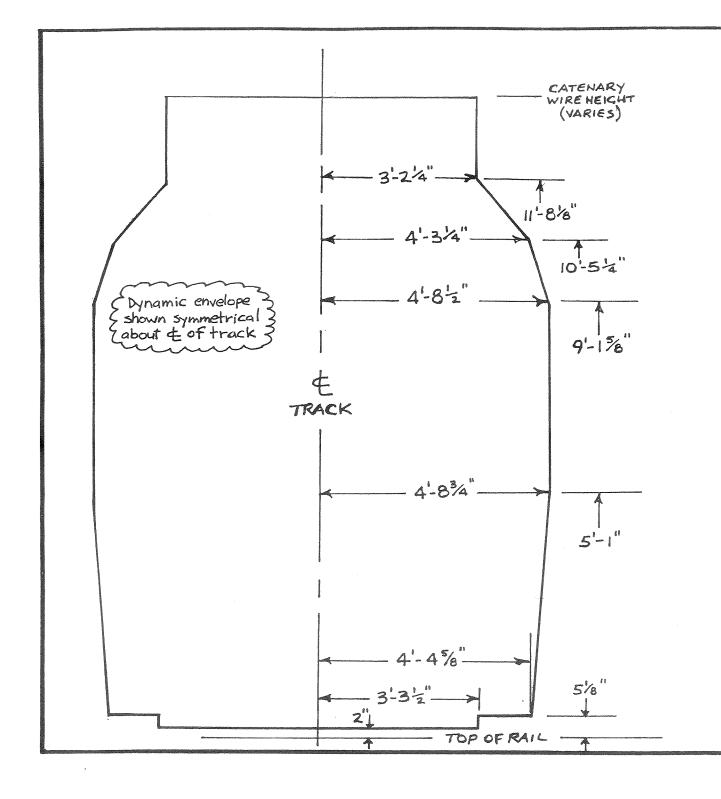












NOTES:

- 1) Dynamic envelope shown for loaded car with truck yaw = 15/8"+ and 3.23° roll angle at car body.
- a clearance envelope represents car on tangent track with o" superelevation. Calculated car body overhang and actual SE MUST BE CONSIDERED. BECAUSE of nonrectangular configuration of the LRV car body, special considerations apply to end overhang calculations (in curves). Additional data is available from the M.O.W. Division track engineering staff.
- Brecommended clearance is 6" beyond dynamic envelope represented here with overhang due to curvature and any SE added. Absolute minimum charance is 3" beyond worst case dynamic envelope. A field survey of existing conditions and the use of a clearance car and/or car body template adjusted for track geometry is required to confirm actual clearance requirements.

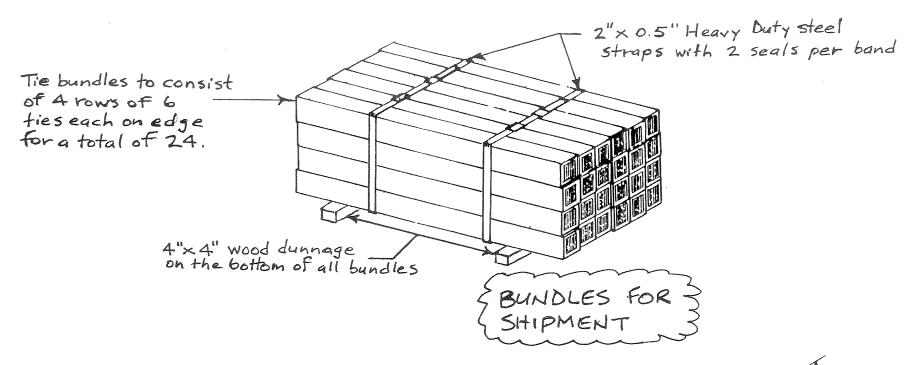


M.O.W. DIVISION DWG: 160 1554E

LRT TRACK

STANDARD DYNAMIC CLEARANCE ENVELOPE - COMPOSITE LRV

Mgr. Track Engineering Director M.O.W.



Top of tie

- Apply gang-nail/anti-splitting device both ends of the per M.O.W. Division specifications

STANDARD WOODEN CROSSTIE

NOTE:

All ties to conform to M.O.W. Division specifications for "Wooden Crossties" in all respects.



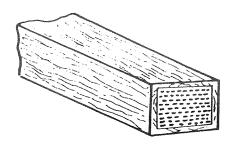
M.O.W.

DWG: 200

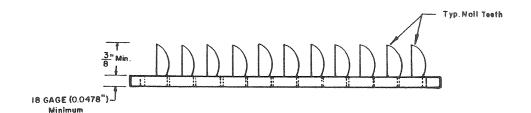
1554 E DATE NO. ___

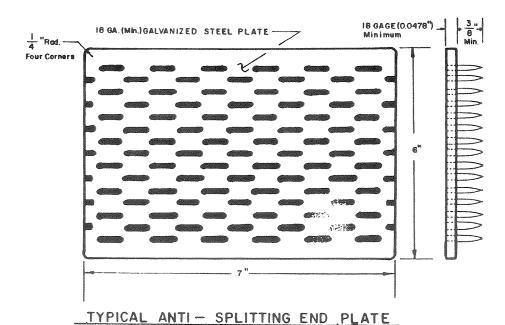
STANDARD WOODEN CROSSTIE

Mgr. Track Engineering



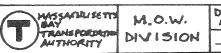
TYPICAL TIE END VIEW





NOTES:

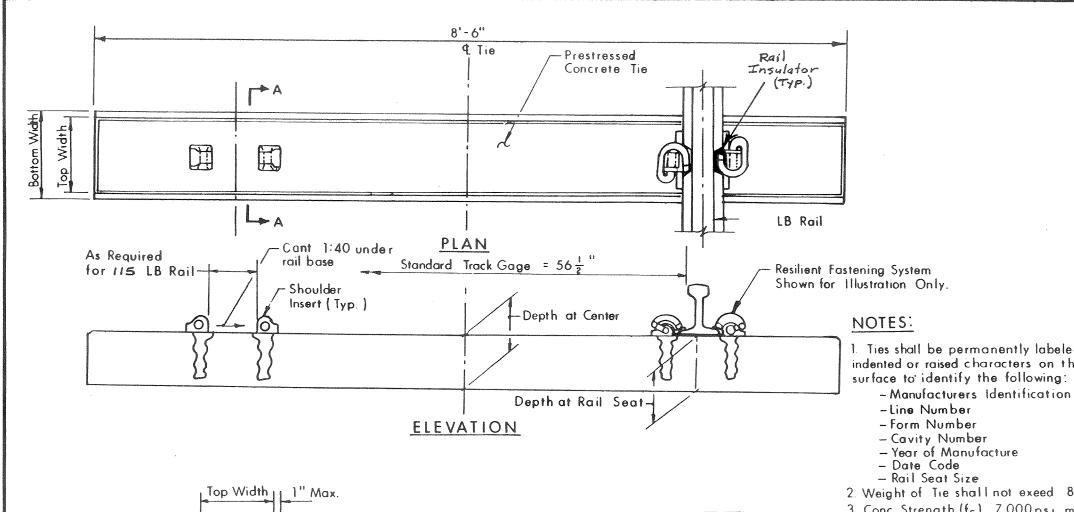
- 1) The anti-splitting end plate shall be manufactured from a minimum 18 Ga. (0.0478") galvanized steel plate conforming to ASTM A446, Grade 4; galvanizing conforming to ASTM A525.
- DENd plate shall have noil teeth not less than 3/8" in length and of sufficient sharpness to fully penetrate hardwood timbers used for cross ties.
- 3 End plate shall be machine applied to the tie ends by a mechanical device capable of squeezing any splits in tie ends together before application of end plate.
- Of End plate applicator shall install end plates with uniform pressure and minimum teeth bending and so that the nail teeth side of the end plate is flush with the end surface of the tie.
- OThe end plate is to be installed in new ties prior to seasoning.
- Othe center of the end plate shall be installed no more than 1/2" off the horizontal and vertical centerline intersections of the tiend.
- The end plate shall be fabricated so that the teeth twist vertically for better gripping capability in the tie.
- B Mark and in stall plates to indicate location of heartwood (KERF Marks).

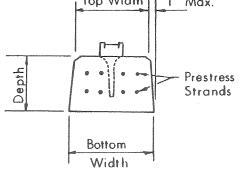


0.W. NO. 201

ANTI-SPLITTING END PLATE FOR WOODEN CROSS-TIES

Mgr. Track Engineering





SECTION A-A

Dimension Description	Minimum	Maximum	Tolerance
Top Width	9"	10"	± 1/8"
Bottom Width		12''	± 1/8"
Depth at Center	7''	10"	+1/4"-1/8"
Depth at Seat	91/2"	101/2"	+ 1/4"-1/8"

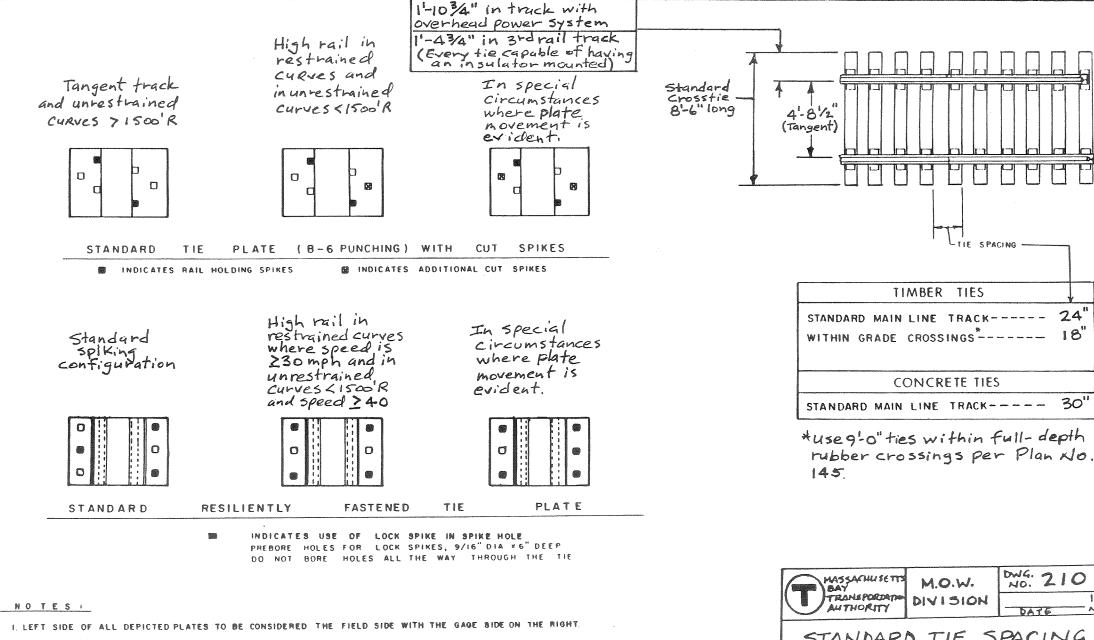
- 1. Ties shall be permanently labeled by indented or raised characters on the top surface to identify the following:

- 2. Weight of Tie shall not exceed 800 lbs.
- 3. Conc. Strength (fc), 7,000 p.s. min at 28 days



CONCRETE TIE

Mgr. Track Engineering



2. SEE SHEET 220 FOR LOCK SPIKE DETAIL

DWG: 210 1554E DATE STANDARD TIE SPACING,

USAGE AND SPIKING PATTERNS

Mgr. Track Engineering

Director - M.O.W.

30"

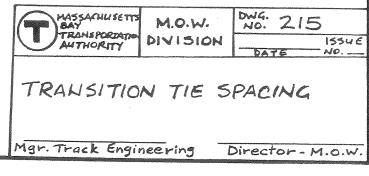
"Standard" Tie Spacing 10 Ties (8'-6")@ 22"o.c. 10 Ties (8'-6")@ 20"o.c. 10 Ties (8'-6")@ 18"o.c. "Stricture Z

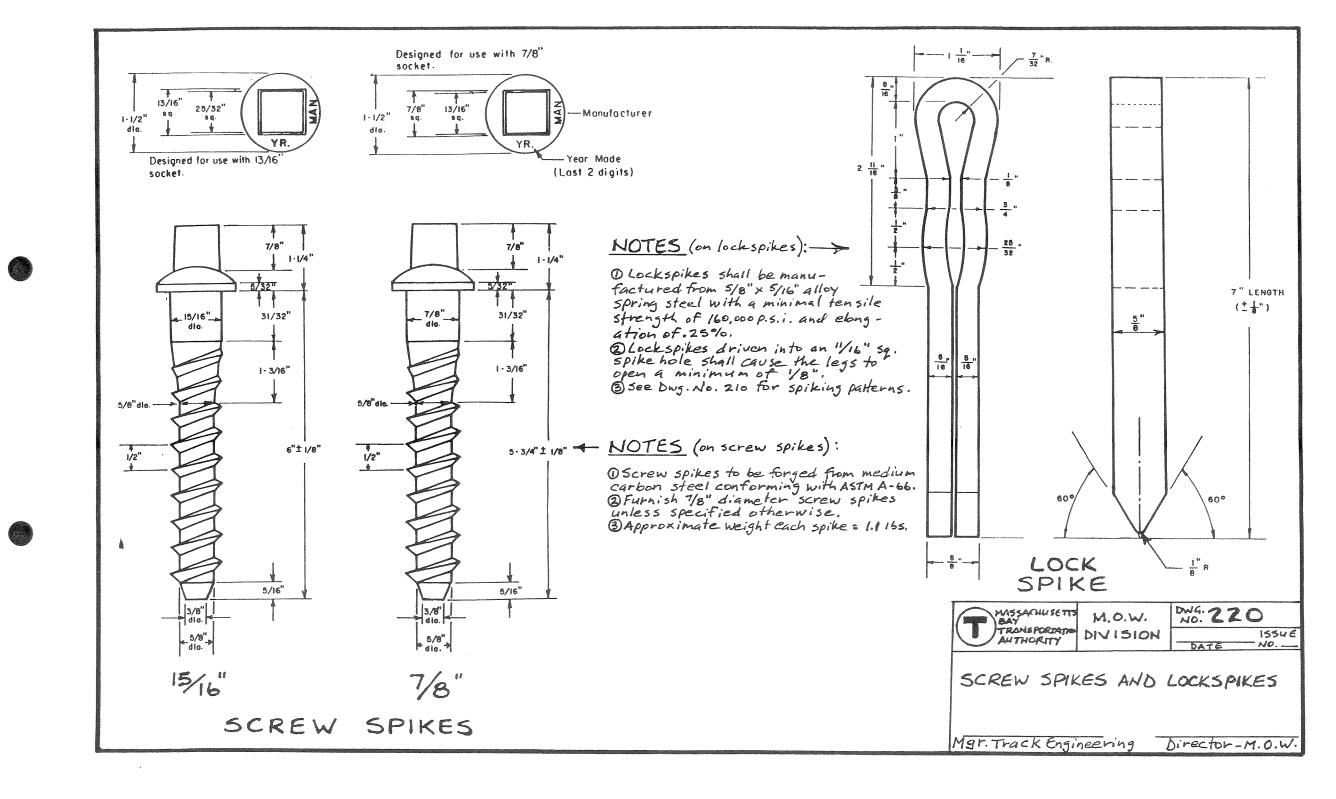
NOTES:

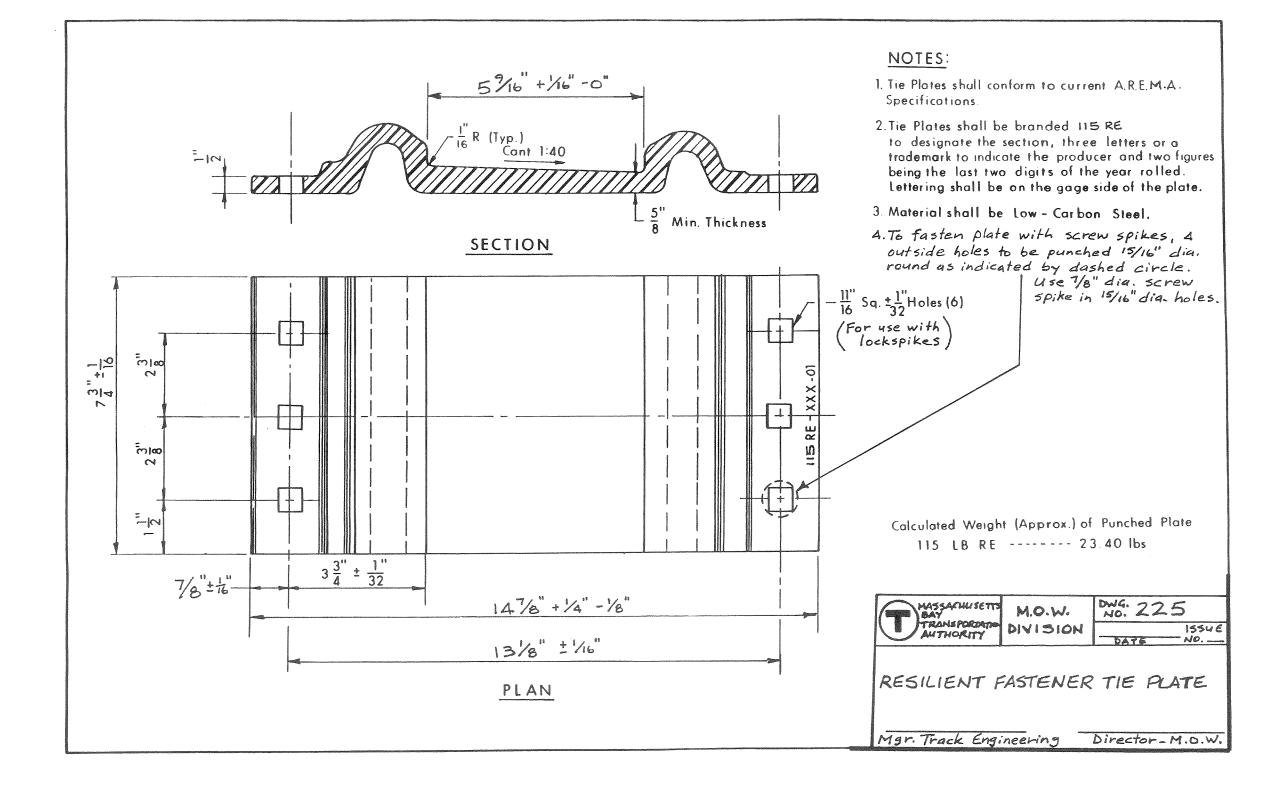
OTransition Ties to be used wherever a significant change in track modulus (Stiffness) occurs.

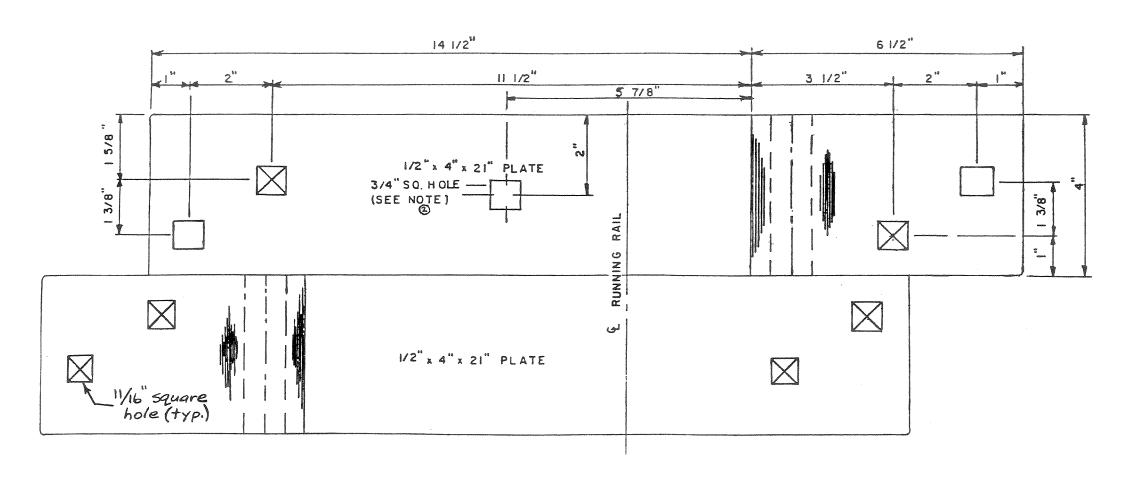
Q"Stiffer" Track Structure consists of a) Concrete Ties, b) Bridge Deck or Approach Slab, c) HAA underlayment for grade xing, turnout, etc. or d) Direct Fixation Track Construction.

3 Transition tie spacing shown is for 50 mph track. Substantial latitude in transition tie spacing requirements is possible for lower speed track at the discretion of the Manager of Track Engineering.



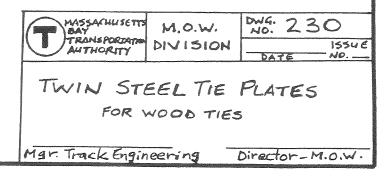




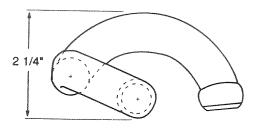


NOTES:

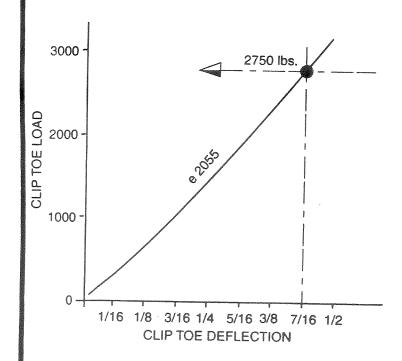
- ① Six (6) lockspikes shall be installed per two (2) plate assembly as indicated by holes shown Ø. Prebore spike holes 9/16"x 6" deep, not through tie bottom.
- @ 3/4" hole is provided for temporary 5/8" cut spike installation, if required, should running rail need to be installed without restraining rail temporarily to facilitate phased track construction.
- 3 Material shall be Low-Carbon Steel and shall conform to current AREMA Specifications.

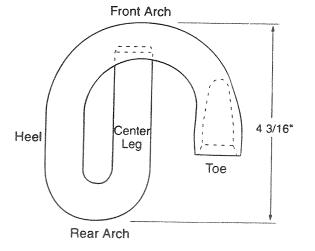


Clip	"e" 2055
Bar Diameter	20 mm
Nominal Toe Load	2,750 lbs.
Working Deflection	7/16"
Nominal Rail Seat Clamping Force	5,500 lbs.
Surface Area in	
contact with	
insulator or rail	.82 sq. in.



The "e" clip design utilizes the toe to bear on the rail base. The toe is flattened to provide a large bearing area on the rail or insulator.

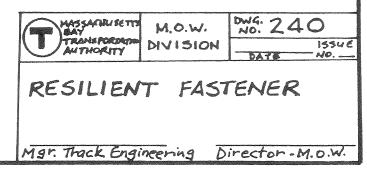


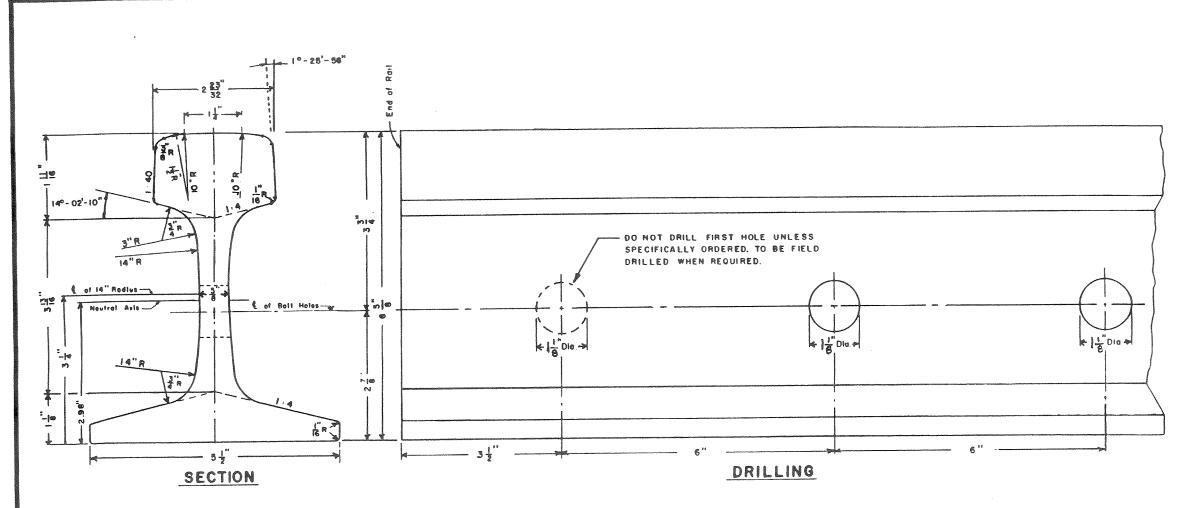


Chamfered center leg allows easy setting and driving.

Notes:

- 1) Clips shall be one-piece, threadless, detachable, fabricated from heat-treated alloy spring steel and shall generate rail holding force by spring action. Two clips make a complete assembly. Clips must be capable of being installed and removed by one person with standard track tools.
- 2) Clips shall exert a minimum hold-down force (toe load) of 2,500 lbs. per clip, 5,000 lbs. per complete assembly for the typical application. Atypical applications may require different hold-down forces.
- The minimum static longitudinal slip per complete assembly shall be 2,400 lbs. per AREMA specifications.
- Clips shall be designed and produced by an ISO 9000 certified manufacturer with at least 10 years proven, successful in-track service within the U.S.
- 5) Random production samples of clips with a hold-down force as specified in #2 above must pass a 3,000,000 cycle vertical dynamic deflection test of 0.04" (+/- .002") above nominal rail clip installed deflection without failure.
- 6) Clips shall be supplied by the manufacturer of the clip housing (resilient fastener tie plate, weld-on shoulder, embedded shoulder, etc.) to ensure the integrity of the fastener system.
- 7) Each clip must bear manufacturer's identification and the last two digits of the year of manufacture.





NOTE:

Rail shall conform in every respect with the current AREMA specs., Vol. 1, Chap. 4. except as modified herein and in the MBTA "Specification for Steel Rails" contained in the M.O.W. Div. Book of Standard Specs.

MINIMUM MATHEMATICAL ATTRIBUTES

		Moment of Inertie 65.6
Area Sq. In.	Percent	Sec Modulus of Head 18.0 Sec Modulus of Base 22.0
ed 3.91 eb 3.04 dse 4.29 Total- 11.25	34.8 27.1 38.1	Rotio M.i. to Area 5.83 Rotio Sec Modulus Head to Area 1.60 Rotio Height to Base1.20 Weight per Yerd114.7 Net Tone per Mile of Track 201.87



M.O.W.

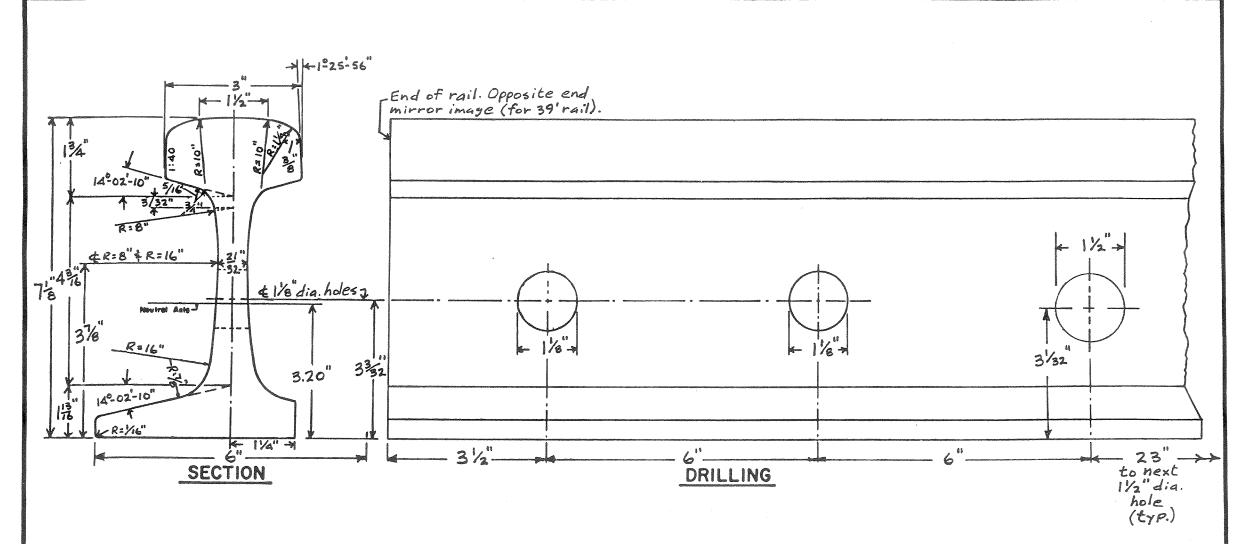
DWG. 300

NO. ___

,

115 RE RAIL

Mgr. Track Engineering



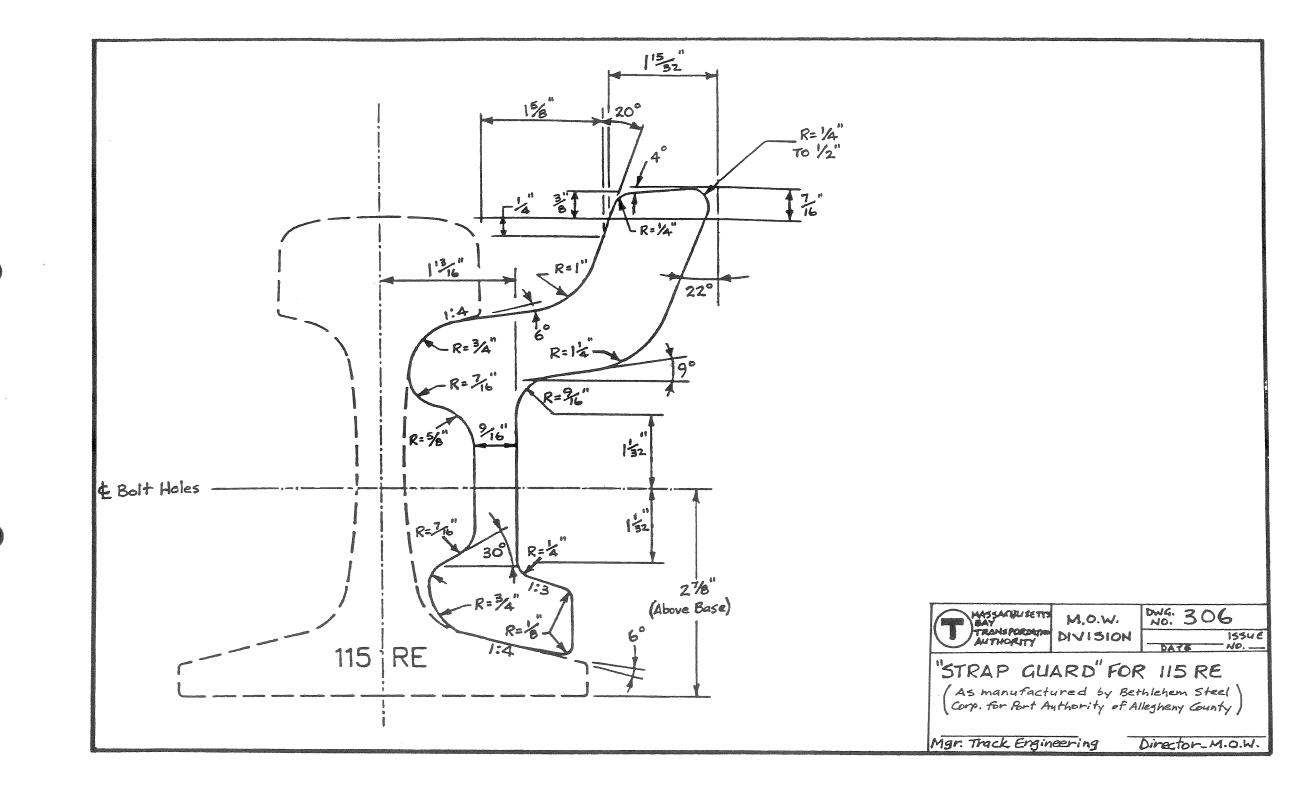
NOTE:

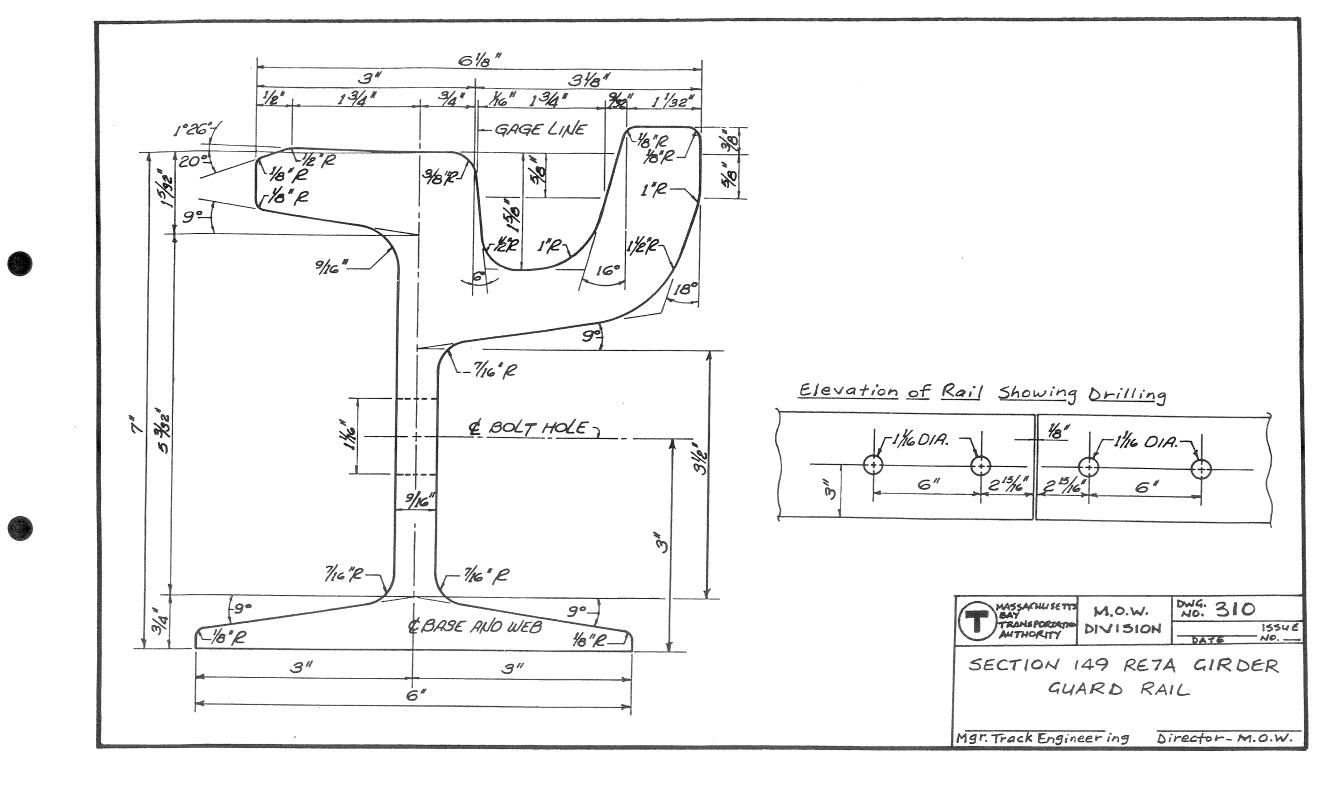
Rail shall conform in all respects with the current AREMA Specifications, Volume 1, Chapter 4, except as modified hereon and in the MBTA "specification for steel Rails" contained in the M.O.W. Division Book of Standard Specs.

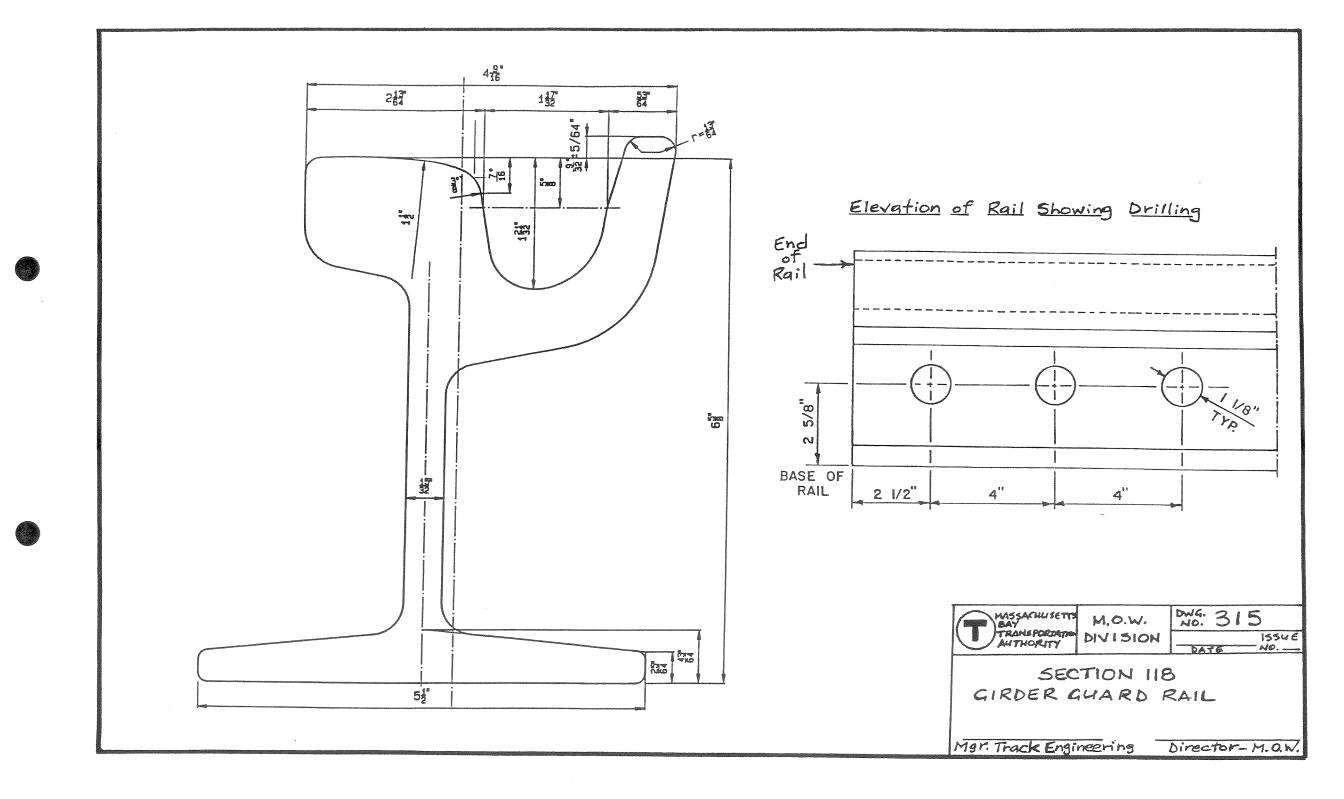


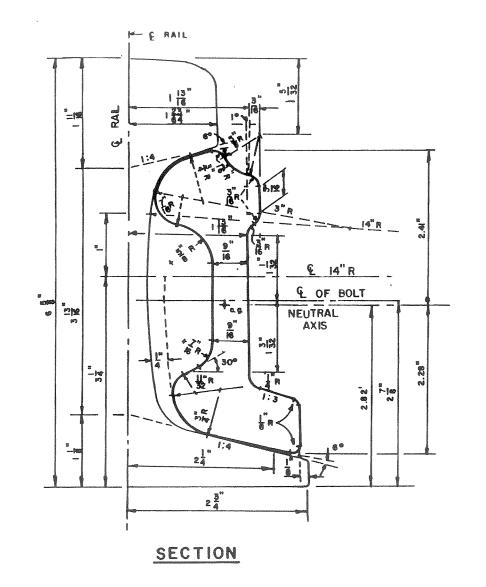
132 RE RESTRAINING RAIL

Mgr. Track Engineering



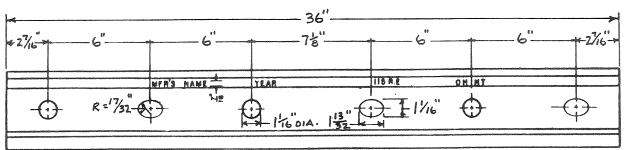








PLAN



ELEVATION

NOTES:

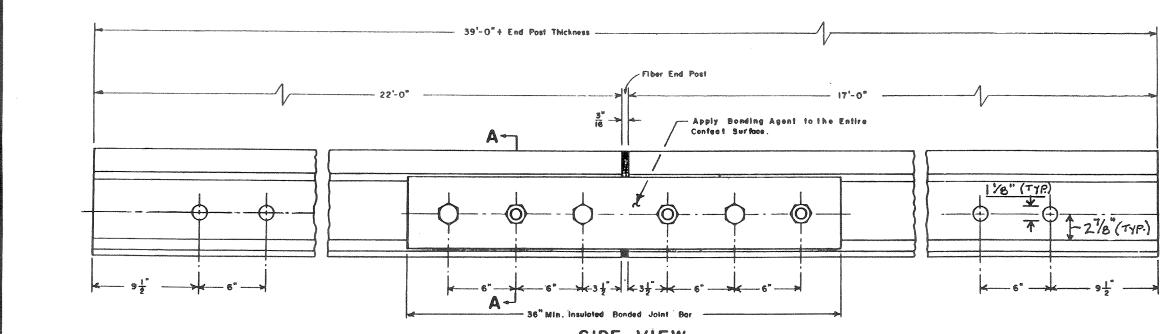
- OJoint Bars to be in accordance with current AREMA "Specifications for Quenched Carbon Steel Joint Bars".
- 3 Joint Bars to be Short Toe and Headfree design. Bars shown are for use with I" elliptical neck track bolts.



M.O.W. DIVISION WG: 320 1554E

JOINT BAR DETAILS for 115 RE SECTION RAIL

Mgr. Track Engineering



NOTES:

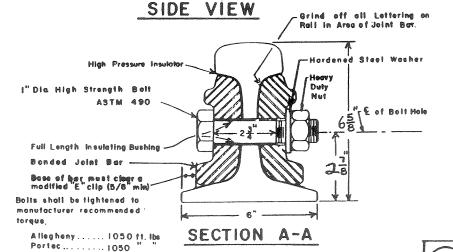
ORails to conform with current AREMA specification for Heat-Treated Rails.

1 Conical reamer to be applied to both holes

at bonded joint to remove burrs.

(3) Use only modified "e" clip at bonded joint.

(4) Refer to specifications for "Insulated Joint Kit" in MBTA Book of Material specs.

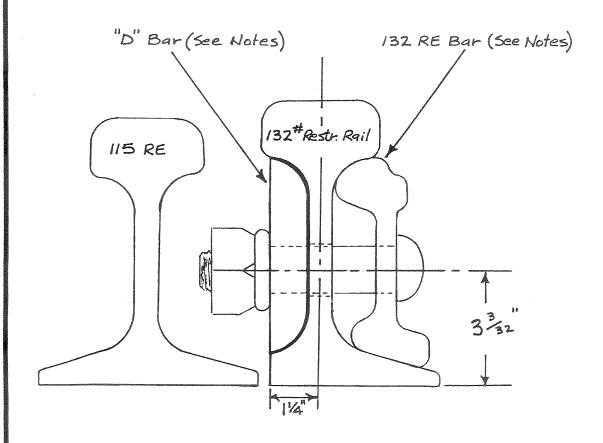


MASSACHUSETTS BAY TRONSPORTATION AUTHORITY

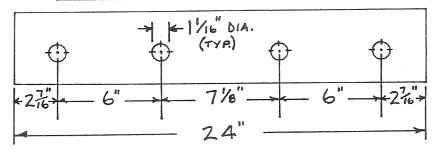
M.O.W. DIVISION W6: 325 1554 E

115 RE BONDED INSULATED JOINT

Mgr. Track Engineering

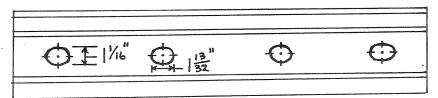


Elevation - "D" Bar



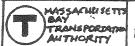
Bar punchings common to both bars except hole size and shape.

Elevation - 132 RE Bar



NOTES:

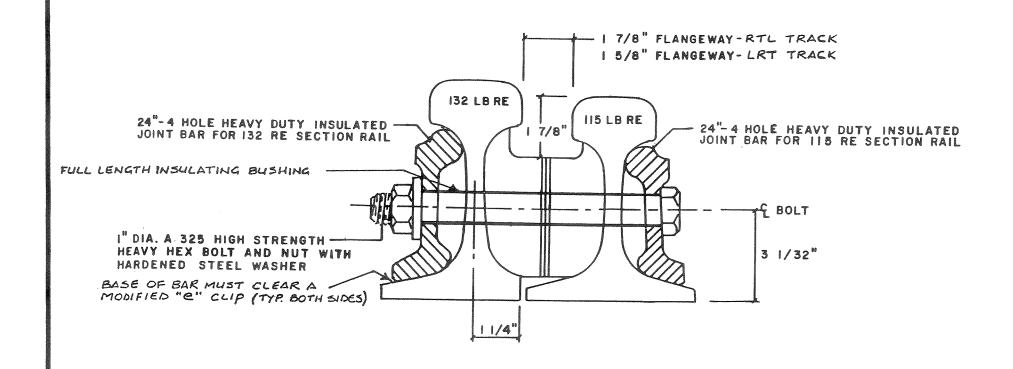
- OBar for outside of assembly to be standard, headfree 24" long with punching for four I" oval neck, heat-treated carbon steel track boits,
- DBar on 115 RE Side of assembly to be machined steel with true fishing for 132 RE rail. Bar to be 1" thick x 24" long with four 116" circular holes.
- 3 Both bars to be in accordance with current AREMA "specifications for Quenched Carbon Steel Joint Bars" as modified herein.



M.O.W. DIVISION DWG: 330

JOINT DETAILS

Mgr. Track Engineering

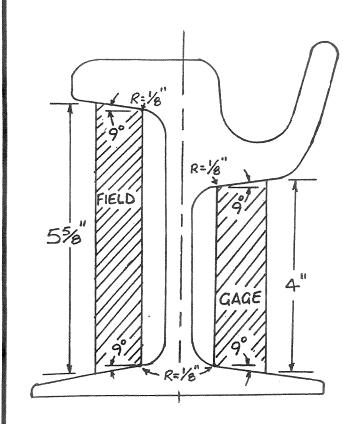


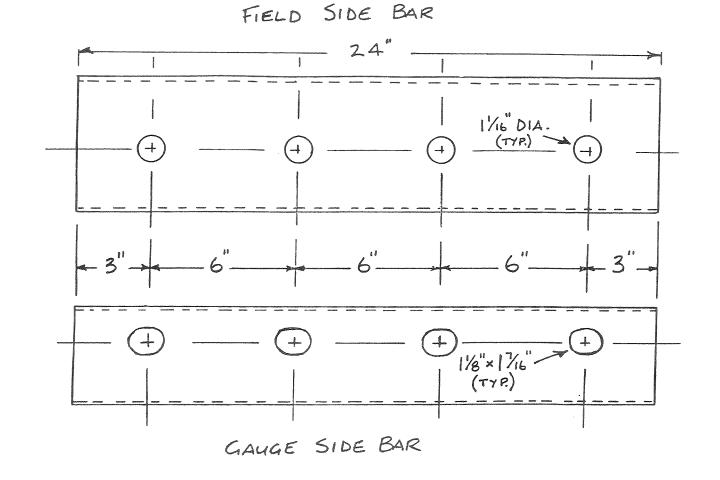
Refer to MBTA Specification for Insulated Joint Bars" in the Book of Standard Track Material Specifications.



SPECIAL INSULATED JOINT
115 RE WITH 132 RESTRAINING RAIL

Mgr. Track Engineering Director M.O.W.

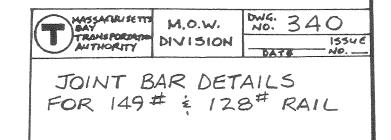




NOTES:

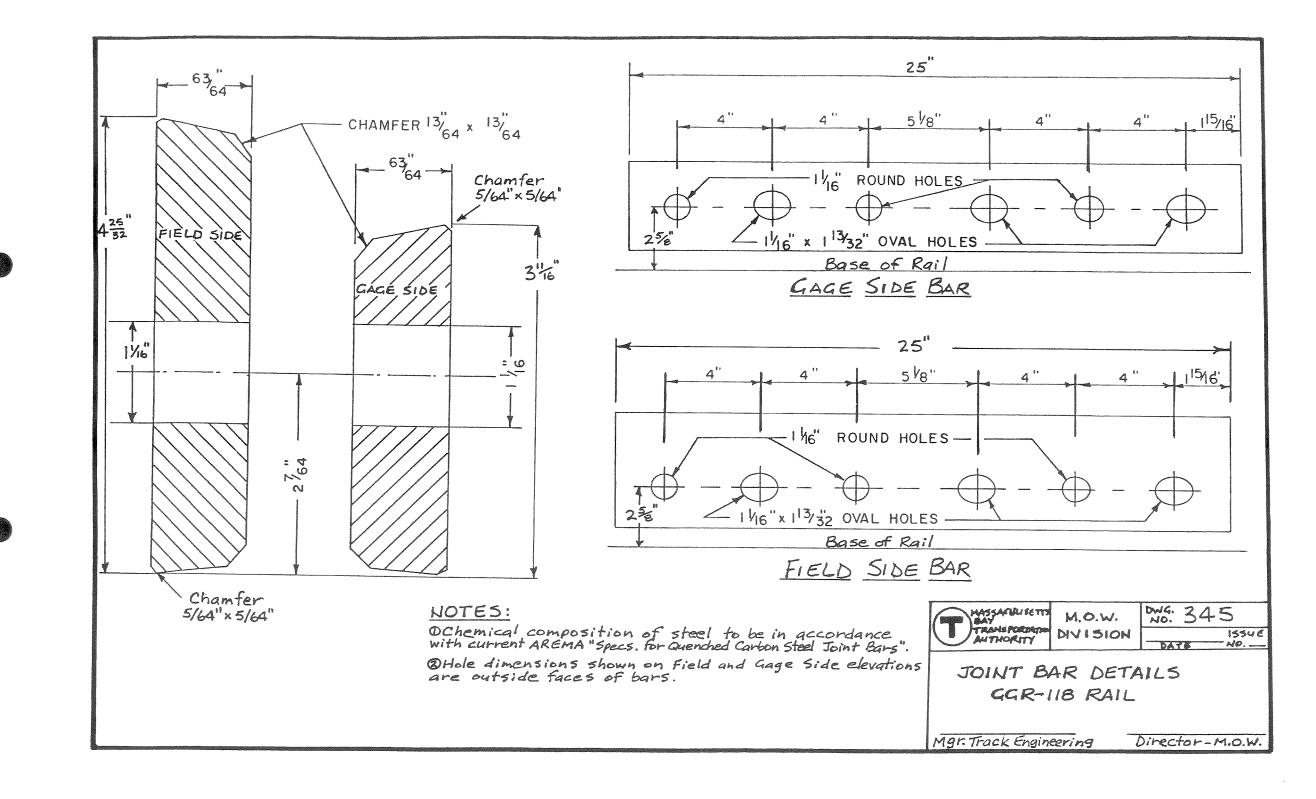
O Chemical composition of steel to be in accordance with current AREMA "Specifications for Quenched Carbon Steel Joint Bars".

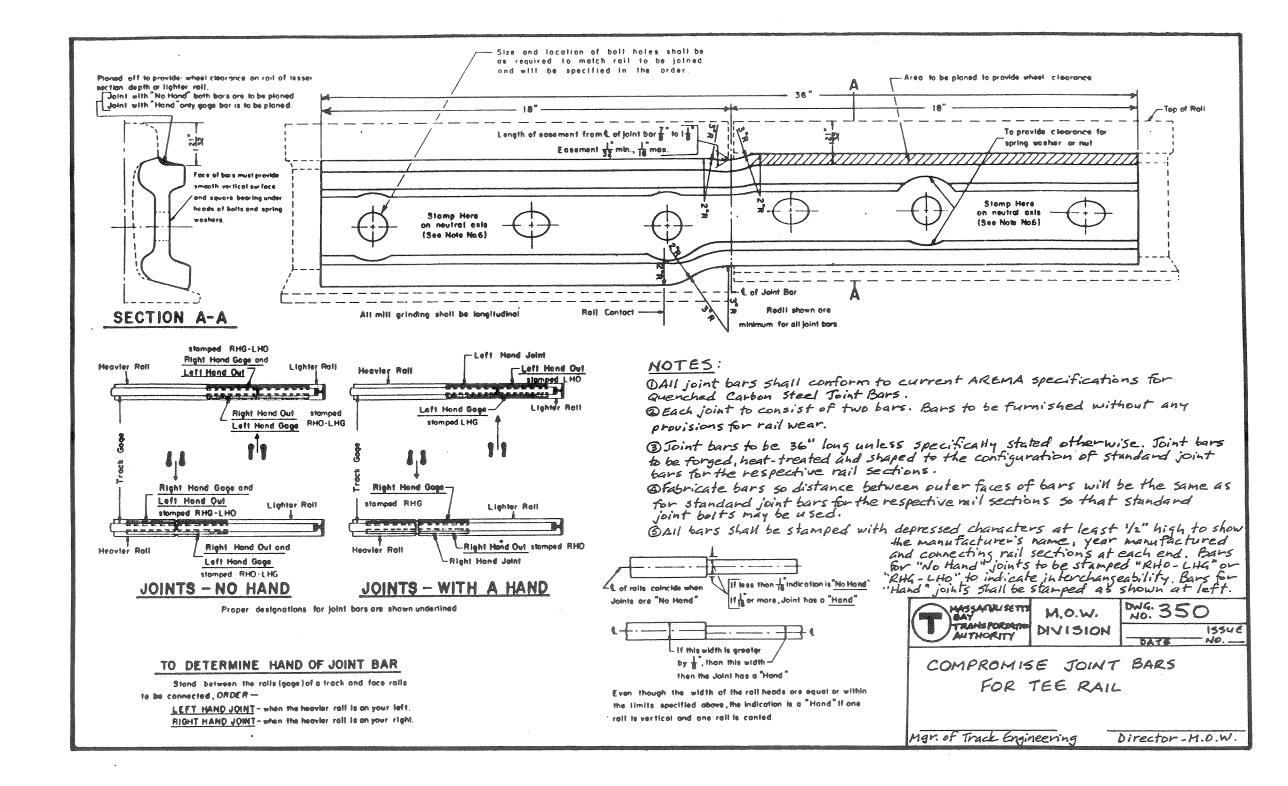
BBoth Field Side and Gage Side bars to be 1/4" thick and otherwise dimensionally as indicated.

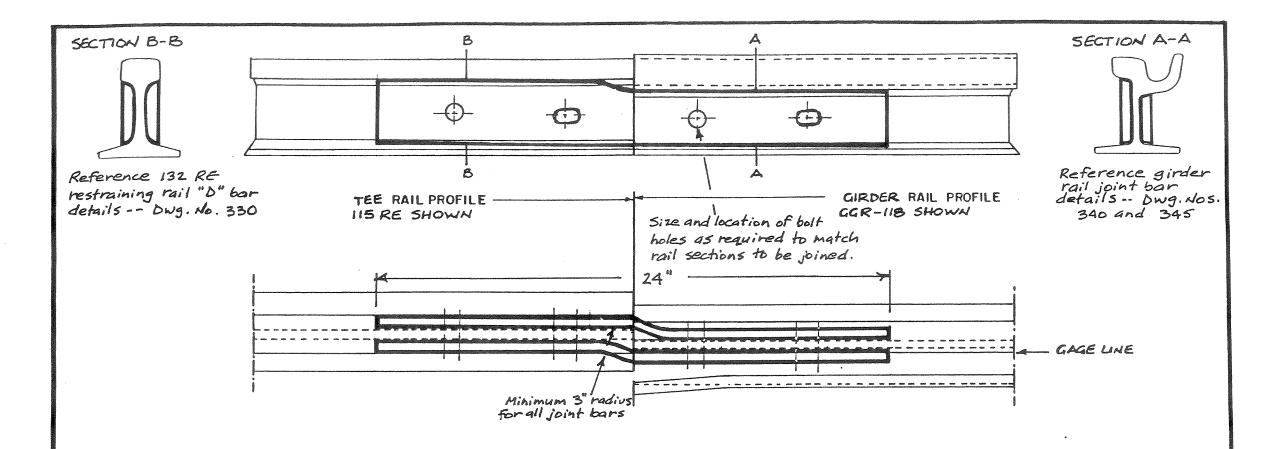


Director-M.O.W.

Mgr. Track Engineering







DAIL joint bars to be machined or forged, heat-treated and shaped to the web configuration of rails specified as shown. Bars to be 24" long unless otherwise specified.

@Bar's shall conform to current AREMA Specifications for Quenched Carbon Steel Joint Bars.

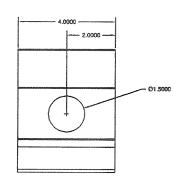
3 Reference Drawing No. 350 in MBTA Book of Standard Trackwork-Plans. @ Bar nomenclature and stamping per Dwg. No. 350.

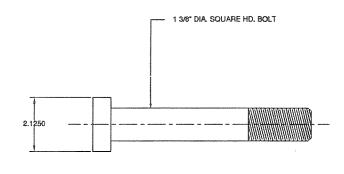
M.O.W. MOISIVIA W6: 355 1554 E

COMPROMISE JOINT BAR BETAILS TEE RAIL TO GIRDER RAIL

Mgr. Track Engineering Director-H.O.W.

ADJUSTABLE SPACER BLOCK ASSEMBLY





SIDE VIEW

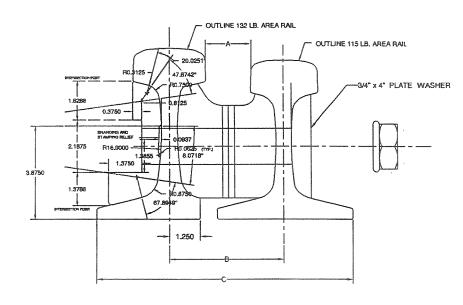
SCALE: 1/4 FULL SIZE

TABLE OF DIMENSIONS

	THEORETICAL DIMENSIONS SHIMS				
	*A	В	С		
Surface Lines (Green Line)	1 5/8"	4 15/32"	10 7 <i>/</i> 32*	1 @ 1/4°	
Rapid Transit (Red, Orange, Blue)	1 7/8° (Tolerance	4 23/32** of Completed	10 15/32" d Assembly =	2 @ 1/4° +/- 1/16°)	

* Restraining rail standard for surface line curves 100' Rad. and above but less than 1,000' Rad.; rapid transit curves 150' Rad. and above but less than 1,000' Rad.

Bolts and spacer blocks typ. 30° o.c. located midway between ties or fasteners.



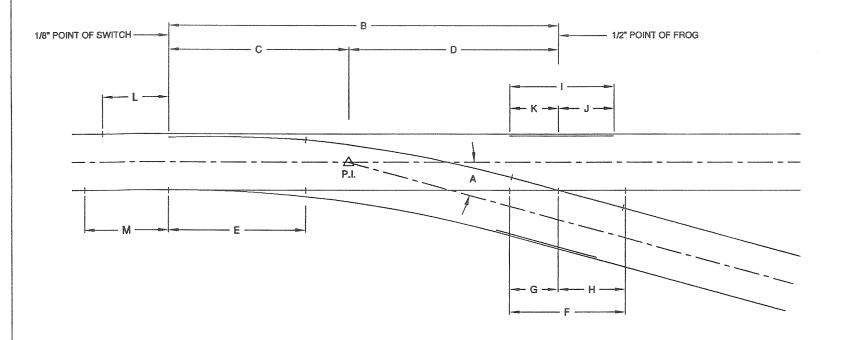
CROSS SECTION VIEW

SCALE: 1/4 FULL SIZE



ADJUSTABLE SPACER BLOCK ASSEMBLY WITH RESTRAINING RAIL BOLT

MGR. TRACK ENGINEERING DIRECTOR - M.O.W.



TURNOUT	ANGLE		DIMENSIONS												
NUMBER	Α	В	С	D	E	F	G	Н		J	K	L_	М	L	М
6	9'-31'-38"	49'-9"	21'-3"	28'-6"	13'-0"	11'-0"	3'-9"	7"-3"	13'-0"	4'-7 1/2"	8'-4 1/2"	5'-7"	7'-3"	12'-3"	13'-11"
8	7-09'-10"	58'-11 1/8"	20'-11 1/8"	38'-0"	13'-0"	13'-0"	5-1"	7'-11"	13'-0"	5'-8 1/2"	7-3 1/2"	5'-7"	7'-3"	12'-3"	13'-11"
10	5"-43'-29"	78'-11"	31'-5"	47"-6"	19'-6"	16'-6"	6'-5"	10'-1"	13'-0"	6'-9 1/2"	6-2 1/2"	5'-7°	7'-3"	12'-3"	13'-11"
12	4-46-19	87'-3 1/2"	30'-3 9/16"	57-0"	19'-6"	20'-4"	7-9 1/2"	12'-6 1/2"	16'-6"	7'-10 1/2"	8'-7 1 <i>/</i> 2"	5'-7"	7'-3"	12'-3"	13'-11"
15	3'-49'-06"	113'-5"	42'-2"	71'-3"	26'-0"	24'-4 1/2"	9'-5"	14'-11 1 <i>/</i> 2"	16'-6"	9'-11"	6'-7"	5'-7"	7'-3"	12'-3"	13'-11"
20	2'-51'-51"	156'-0 1/2"	61'-0 1/2"	95'-0"	39'-0"	30'-10 1/2"	11'-0 1/2"	19'-10"	20'-0"	12'-7 1/2"	7'-4 1/2"	5'-7"	7'-3"	12"-3"	13'-11"
		~~~~~	***************************************		· · · · · · · · · · · · · · · · · · ·	~ <b>0</b>	b	<u> </u>		***************************************	Secretary of the second	TYP	E "S"	TYP	E "L"

STANDARD TURNOUTS WITH CURVED SWITCH POINTS

A = FROG ANGLE
B = ACTUAL LEAD
C = POINT OF INTERSECTION TO 1/8" POINT OF SWITCH
D = POINT OF INTERSECTION TO 1/2" POINT OF FROG
E = LENGTH OF SWITCH POINT
F = LENGTH OF FROG
G = TOE LENGTH
H = HEEL LENGTH
J = 1/2" FROG POINT TO END OF GUARD RAIL
K = 1/2" FROG POINT TO END OF GUARD RAIL
L = 1/8" POINT OF SWITCH TO END OF STOCK RAIL

M = 1/8" POINT OF SWITCH TO END OF STOCK RAIL

NOTE: DIMENSIONS GIVEN ARE BASED ON TRACK GAGE OF 4' - 8 1/2" THROUGHOUT.

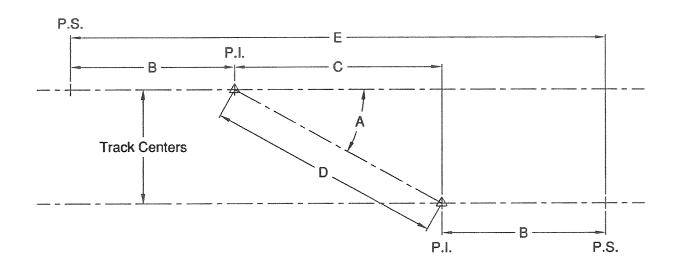


# STANDARD TURNOUTS GENERAL LAYOUT

0

ISSUE NO.

MGR. TRACK ENGINEERING DIRECTOR - M.O.W.



			C			- Out-out-out-out-out-out-out-out-out-out-o	D		E			
TURNOUT	ANGLE		TRACK CENTERS			TF	RACK CENTE	RS	TRACK CENTERS			
NUMBER	Α	В	11'-0"	12'-0"	13'-0"	11'-0"	12'-0"	13'-0"	11'-0"	12'-0"	13'-0"	
6	9'- 31'- 38"	21'-3"	65'-6 1/2"	71'-6"	77'-5 1/2"	66'-5 1/2"	72'-6"	78'-6 <b>1/2"</b>	108'-0 1/2"	114'-0"	119'-11 1/2"	
8	7'- 09'- 10"	20'-11 3/16"	87'-7 7/8"	95'-7 1/2"	103'-7 1/8"	88'-4 1 <i>/</i> 8"	96'-4 1/2"	104'-4 7/8"	129'-6 1/4"	137'-5 7/8°	145'-5 1/2°	
10	5'- 43'- 29"	31'-5 1/16"	109'-8 3/4"	119'-8 7/16"	129'-8 1/8"	110'-3 5/16"	120'-3 5/8"	130'-3 15/16"	172'-6 7/8"	182'-6 9/16"	192'-6 1/4"	
12	4'- 46'- 19"	30'-3 9/16"	109'-8 3/4"	119'-8 7/16"	129'-8 1/8"	110'-3 5/16"	120'-3 5/8"	130'-3 15/16"	192'-4 3/8"	204'-4 1/8"	216'-3 7/8"	
15	3°- 49'- 06"	42'-2 1/16"	164'-9 13/16"	179'-9 9/16"	194'-9 3/8"	165'-2 3/16"	180'-2 3/8"	195'-2 9/16"	249'-1 15/16"	264'-1 11/16"	279'-1 1 <i>/</i> 2"	
20	2'- 51'- 51"	61'-0 9/16"	219'-10 3/8"	239'-10 1/16"	259'-10 1/16"	220'-1 11/16"	240'-1 13/16"	260'-2"	341'-11 1/2"	361'-11 3/16"	381'-11 3/16"	

#### FOR TRACK CENTERS OTHER THAN SHOWN IN TABLE.

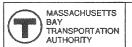
C = TRACK CENTERS / TANGENT ANGLE A

D = TRACK CENTERS / SINE ANGLE A

E = DIMENSIONS C + 2 B

FROG #	TANGENT	SINE
6	0.167831	0.165516
8	0.125492	0.124516
10	0.100254	0.099754
15	0.066741	0.066593
20	0.050031	0.049968

TRACK CENTERS MUST BE CALCULATED USING DECIMALS OF A FOOT.

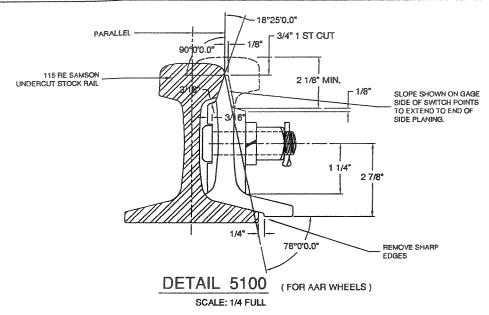


M.O.W. DIVISION DRG. NO. 405

DEC. 1, 2000 ① ISSUE DATE ISSUE NO.

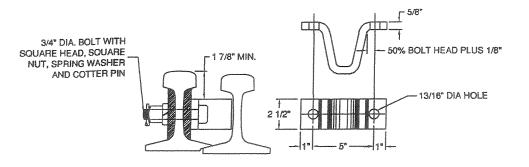
# STANDARD CROSSOVERS GENERAL LAYOUT

MGR. TRACK ENGINEERING

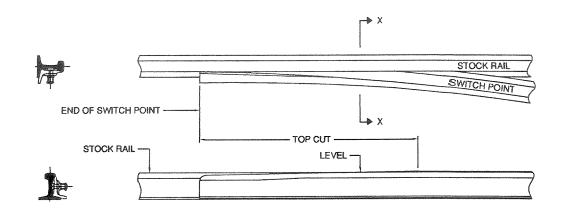


NOTE : ABOVE DETAIL USED ON ALL RAPID TRANSIT LINES. ( EXCLUDES GREEN & MATTAPAN LINES)

REINFORCING BARS TO BE 1/2" THICK; SECURED BY 3/4" RIVETS IN CENTER LINE OF WEB EXCEPT FOR HOLES WITH 1" DIAMETER BOLTS AS INDICATED ON PLAN NUMBERS 121-62, 123-62, 125-62 & 127-62 IN AREMA PORTFOLIO OF TRACKWORK PLANS.

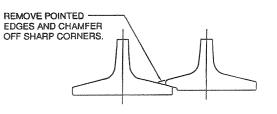


**POINT STOP DETAIL 2024** SCALE: 1/8 FULL

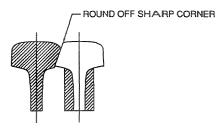


SWITCH POINT PLANING ELEVATION & PLAN VIEWS

SCALE: 1/2" = 1' - 0"



BASE DETAIL PLAN SCALE: 3/16 FULL



**CROSS SECTION X-X** SCALE: 3/16 FULL



MASSACHUSETTS TRANSPORTATION

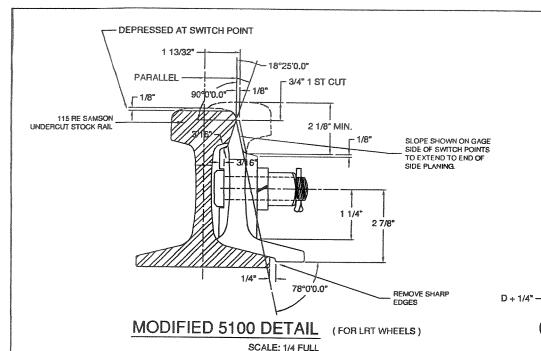
M.O.W. DIVISION DRG. 410 NO. DEC. 1, 2000

ISSUE NO.

ISSUE DATE

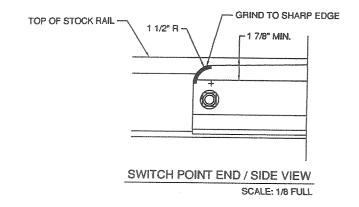
STANDARD SWITCH POINT DETAILS DETAIL 5100, SWITCH POINT PLANING & RAIL STOP

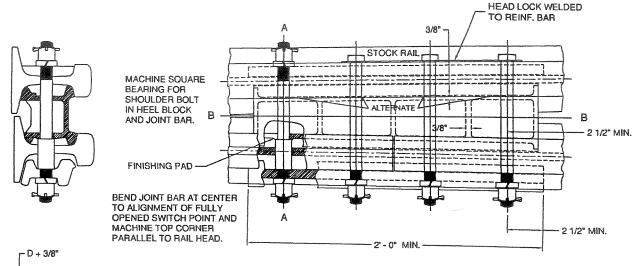
MGR. THACK ENGINEERING



NOTE: ABOVE DETAIL USED ON ALL LIGHT RAIL LINES. (GREEN & MATTAPAN LINES)

REINFORCING BARS TO BE 1/2" THICK; SECURED BY 3/4" RIVETS IN CENTER LINE OF WEB EXCEPT FOR HOLES WITH 1" DIAMETER BOLTS AS INDICATED ON PLAN NUMBERS 121-62, 123-62, 125-62 & 127-62 IN AREMA PORTFOLIO OF TRACKWORK





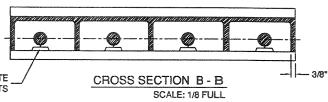
# - RAD, 1/8" MAX, - 1/16" MIN.

#### **DETAIL OF SHOULDER BOLT**

SCALE: 1/8 FULL

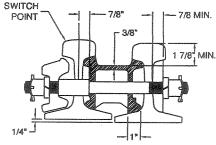
D = DIAMETER OF BOLT ALLOY STEEL S.A.E. 4130 OR EQUIVALENT **HEAT TREATED - BRINELL MIN. 275** 

HEAD LOCK FOR ALTERNATE LENGTH BOLTS



HEEL JOINT ASSEMBLY

SCALE: 1/8 FULL



CROSS SECTION A - A SCALE: 1/8 FULL

DETAIL 2125

OFFSET HEEL

HEEL BLOCK - CAST OR WELDED, CLASS B, HARD. FOR FIT, SEE PLANS BASIC NO. 1010 AND 1011. BOLTS - HIGH TENSILE STEEL AND GENERALLY PER SECTION 1402, APPENDIX A DIAMETER OF BOLTS AND SPACING OF HOLES SHALL CONFORM TO JOINT BAR DETAIL SPECIFIED, EXCEPT THAT WHEN SIX HOLE BARS ARE DESCRIBED. THE BLOCK SHALL BE DESIGNED WITH FIVE HOLES. THE SIXTH HOLE TOWARD THE NARROW END BEING OMITTED AND THE JOINT BARS SHORTENED ACCORDINGLY.



MASSACHUSETTS TRANSPORTATION

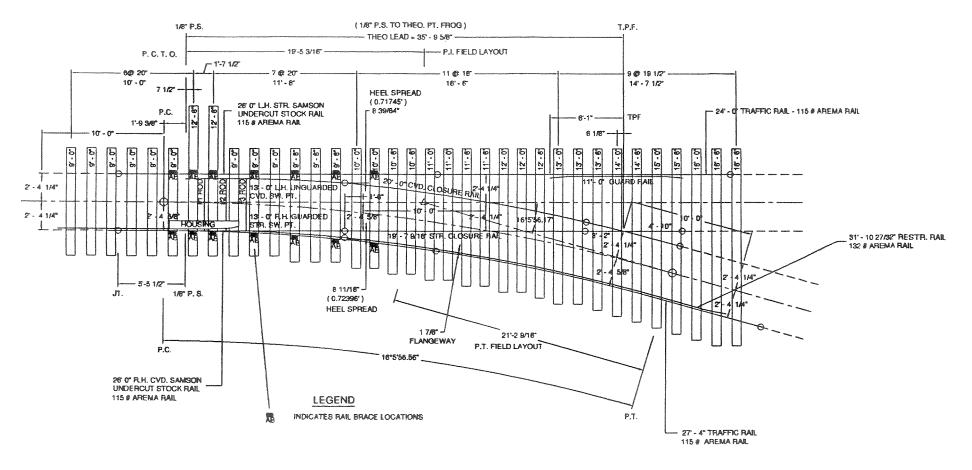
M.O.W. DIVISION DRG. 411 NO. (0) DEC. 1, 2000

ISSUE NO.

ISSUE DATE

STANDARD SWITCH POINT DETAILS MODIFIED DETAIL 5100 AND HEEL BLOCK ASSEMBLY

MGR. TRACK ENGINEERING



## 150' C.R. R.H. TURNOUT (FULLY GUARDED)

SCALE: 1/8" = 1' - 0"

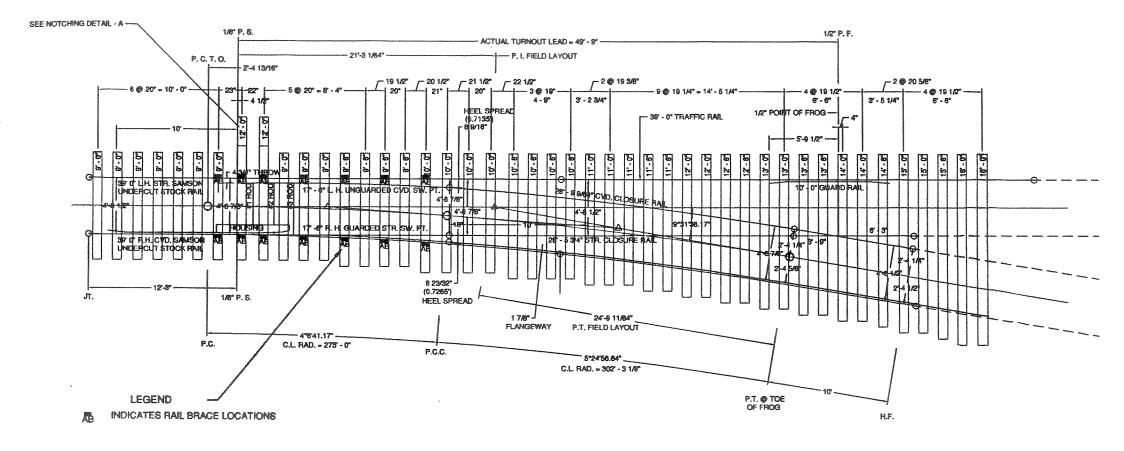
#### NOTES

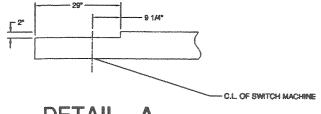
- 1. THIS TURNOUT USED ON RAPID TRANSIT LINES
- 2. GAGE TRANSITIONS IN TEN FOOT LENGTHS AS SHOWN.



TRACKWORK PLAN FOR 150' C. R. TURNOUT **FULLY GUARDED DESIGN** 

MOR TRACK ENGINEERING DIRECTOR - M.O.W.





**DETAIL - A** 

SCALE: 3/8" = 1' - 0"

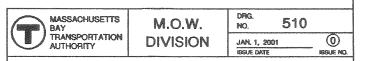
## MODIFIED # 6 R.H. TURNOUT

RNOUT (FULLY GUARDED)

SCALE: 1/8" = 1' - 0"

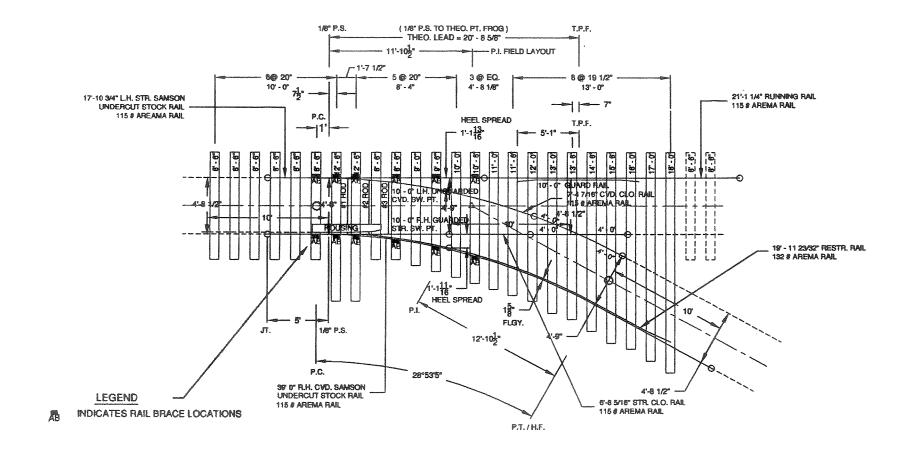
#### NOTES:

- GAGE TRANSITIONS ALWAYS MADE ON INSIDE RAIL OF CURVE AND ON THROUGH SIDE ON STRAIGHT CLOSURE RAIL.
- 2. THIS TURNOUT USED ON RAPID TRANSIT LINES.



AREMA MODIFIED # 6 TURNOUT ( Compound Geometry )
FULLY GUARDED DESIGN

MGR. TRACK ENGINEERING DIRECTOR - N.O.W.



50' C.R. R.H. TURNOUT

(FULLY GUARDED)

SCALE: 1/8" = 1'- 0"

#### NOTES

- 1. THIS TURNOUT USED ON LIGHT RAIL TRACK.
- 2. GAGE TRANSITIONS IN TEN FOOT LENGTHS AS SHOWN.



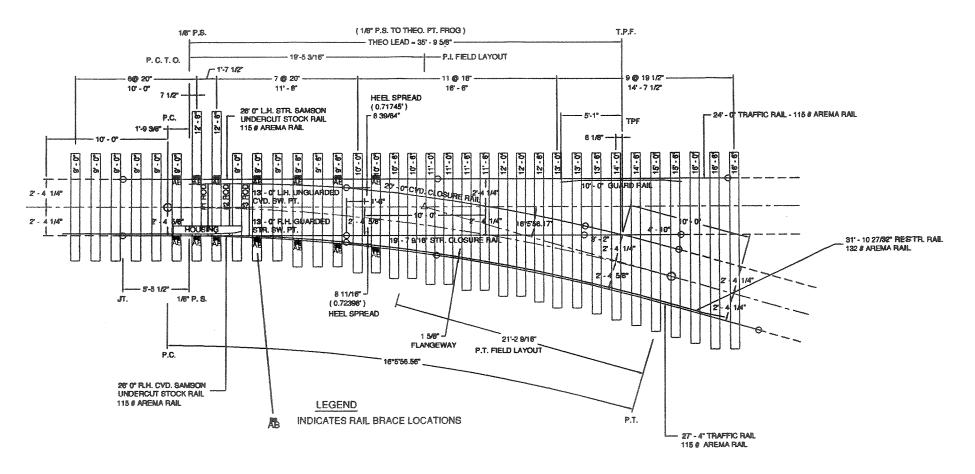
M.O.W. DIVISION

600 NO. 0 JAN. 1, 2001 ISSUE DATE

ISSUE NO.

TRACKWORK PLAN FOR 50' C.R. TURNOUT **FULLY GUARDED DESIGN - LRT** 

MGR. TRACK ENGINEERING

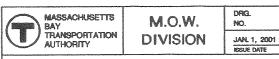


## 150' C.R. R.H. TURNOUT (FULLY GUARDED)

SCALE: 1/8" = 1' - 0"

#### <u>NOTES</u>

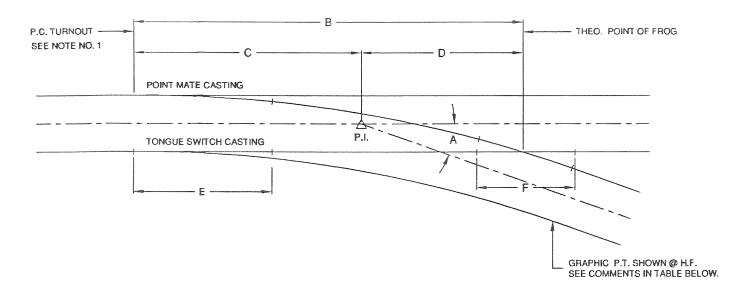
- 1. THIS TURNOUT USED ON LIGHT RAIL TRACK.
- 2. GAGE TRANSITIONS IN TEN FOOT LENGTHS AS SHOWN.



TRACKWORK PLAN FOR 150' C. R. TURNOUT FULLY GUARDED DESIGN - LRT

615

MGR. TRACK ENGINEERING DIRECTOR - N.O.W.



SWITCH	ANGLE						
RADIUS A		В	С	D	E	F	COMMENTS
50'	28°-51'-45"	21' - 8 3/8"	12' - 10 3/8"	8' - 10"	T.S.=11'-0" P.M.=10'-0"	8' - 0"	P.T. @ HEEL OF FROG
75'	23'-03'-24"	26' - 6 7/8"	15' - 3 9/16"	11' - 3 5/16°	12' - 0"	8 0.	P.T. @ HEEL OF FROG
100' *A"	17'-26'-08"	30' - 8"	15° - 3 13/16°	15' - 4 3/16"	13' - 6"	8' - 0"	P.T. @ T.P.F.
100' "B"	19"-40"-30"	30' - 8"	17" - 3 7/8"	13' - 4 1/8"	13' - 6"	8, - 0,	P.T. @ HEEL OF FROG
150'	12'-46'-22"	37 - 7⁵	16" - 8 1/16"	20' - 10 15/16"	15' - 0"	8 0.	P.T. @ TOE OF FROG
200'	11'-15'-05°	43' - 4 3/4"	19" - 6"	23' - 10 3/4°	16' - 6"	8' - 0"	P.T. @ TOE OF FROG

#### STANDARD GIRDER RAIL TURNOUTS

A = FROG ANGLE

B = THEORETICAL LEAD

C = P.C. TO P.I.

D = P.I. TO T.P.F.

E = CASTING LENGTH

F = FROG LENGTHS (ALL FROGS 8'- 0" WITH 4'- 0" ARMS)

#### NOTES

- LOCATION OF P.C. TURNOUT, RELATIVE TO END OF CASTING, VARIES WITH GEOMETRY. REFER TO MBTA PLAN NO. 701 FOR DETAILS.
- REFER TO APPENDIX 1 OF GIRDER RAIL SPECIAL TRACKWORK SPECIFICATION FOR GAGING AND FLANGEWAY CRITERIA.



M.O.W. DIVISION DRG. 700

JAN. 1, 2001

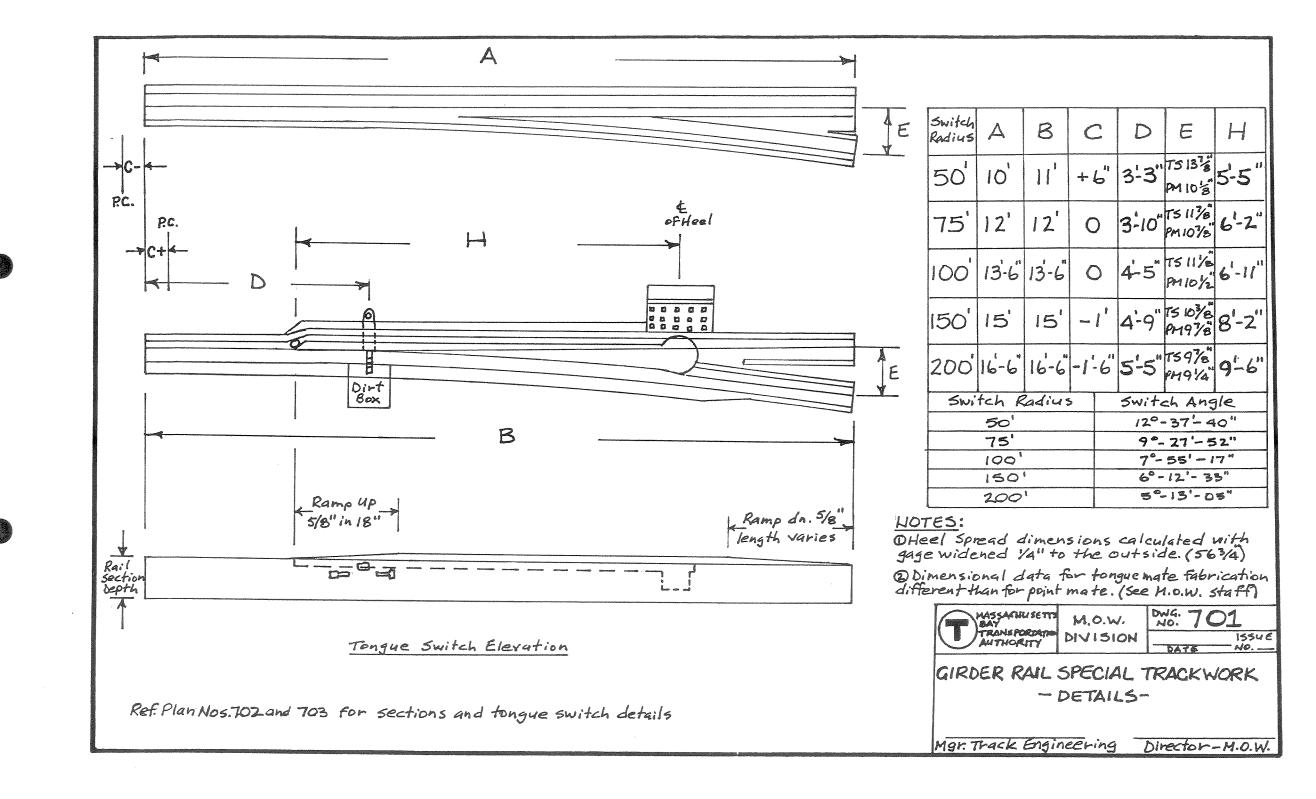
ISSUE DATE

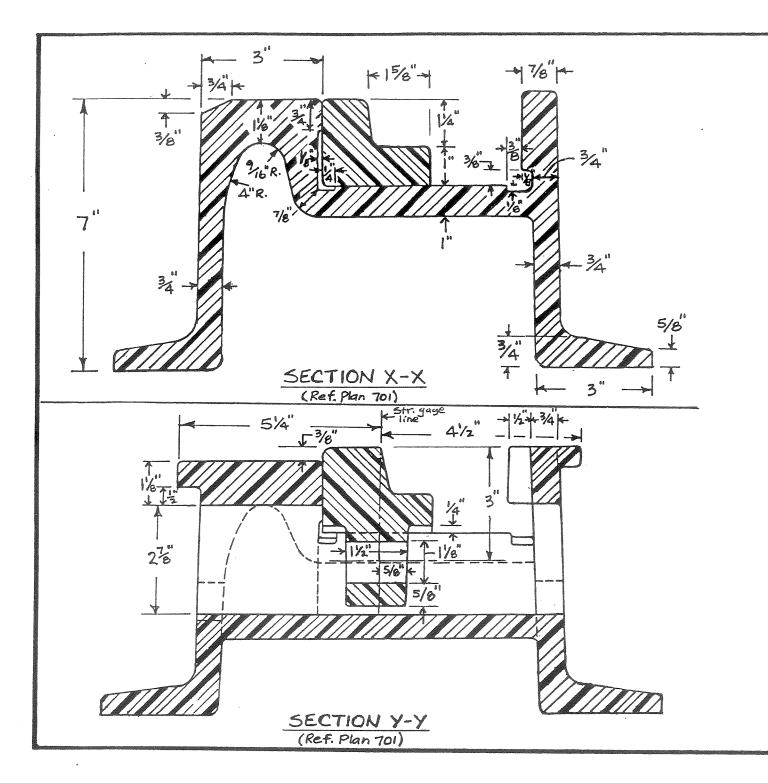
DRG. 700

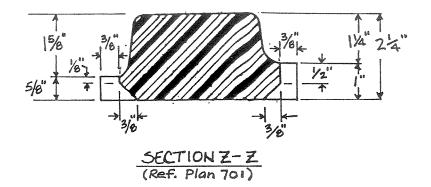
SSUE NO. 700

TRACKWORK PLAN FOR GIRDER RAIL SWITCHES GENERAL LAYOUT

MGR. TRACK ENGINEERING







- DRefer to Plan No. 701 for location of Sections x-x, Y-Y and Z-Z on Plan View of Tongue Switch.
- 2 Refer to Plan No. 702 for other Sections and details of Tongue Switch fabrication.
- @ Refer to Specification for Girder Rail Special Trackwork in the Book of Standard Track Muterial/Construction Specs.



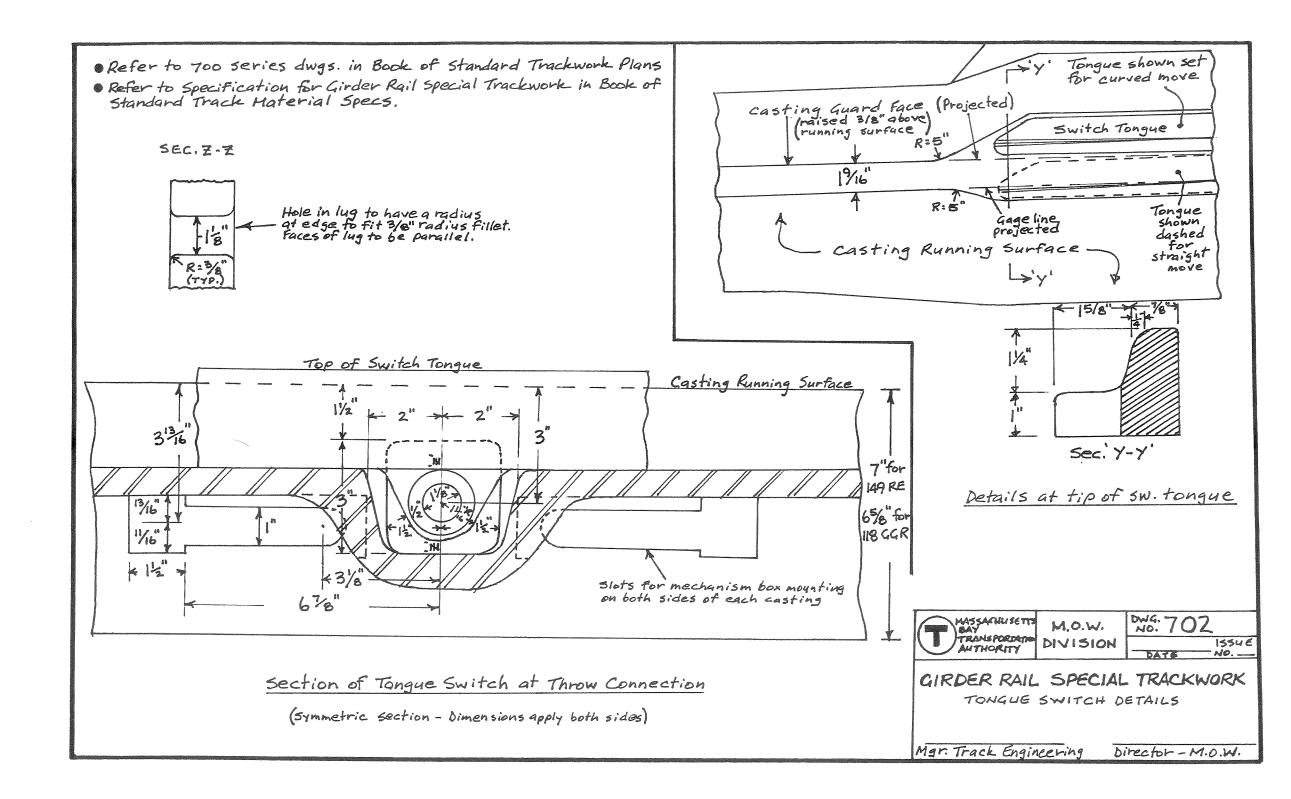
M.O.W. DIVISION DW4: 703

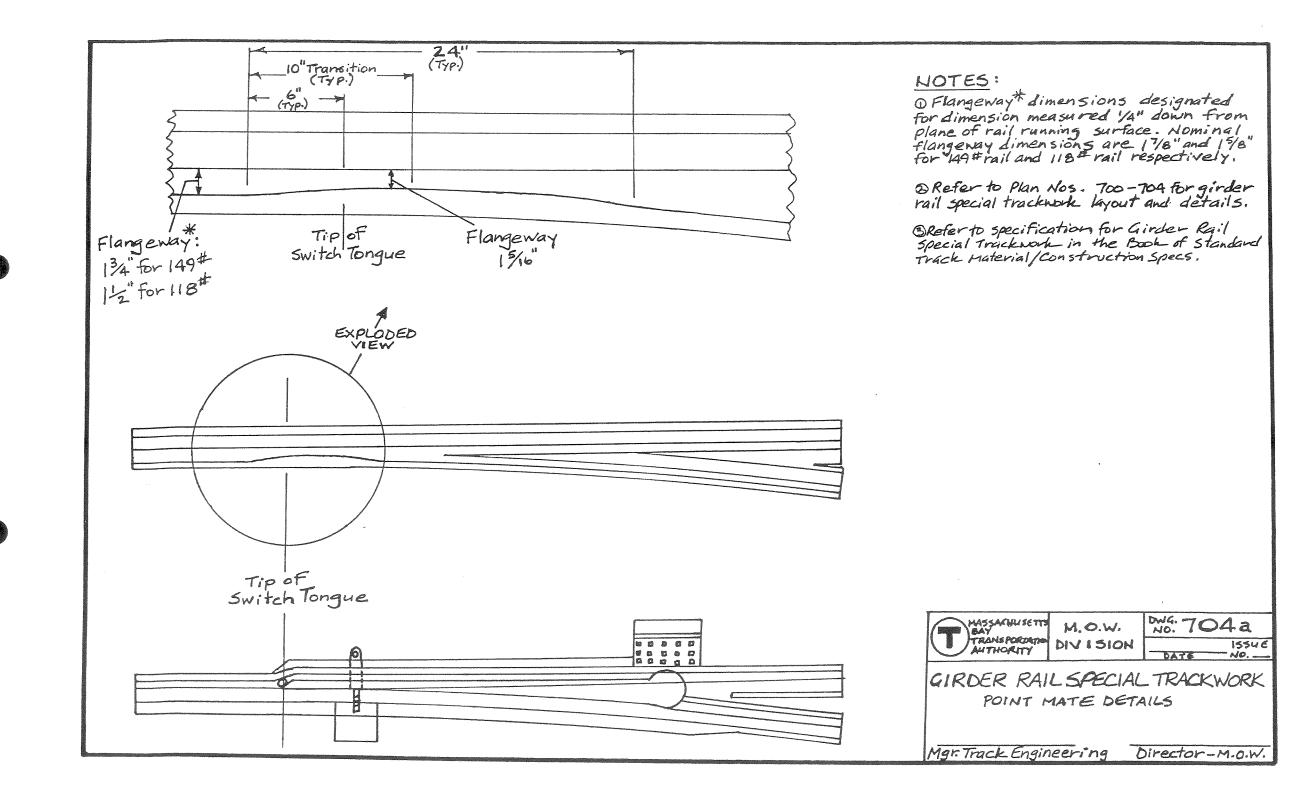
1554 É DATE NO. ___

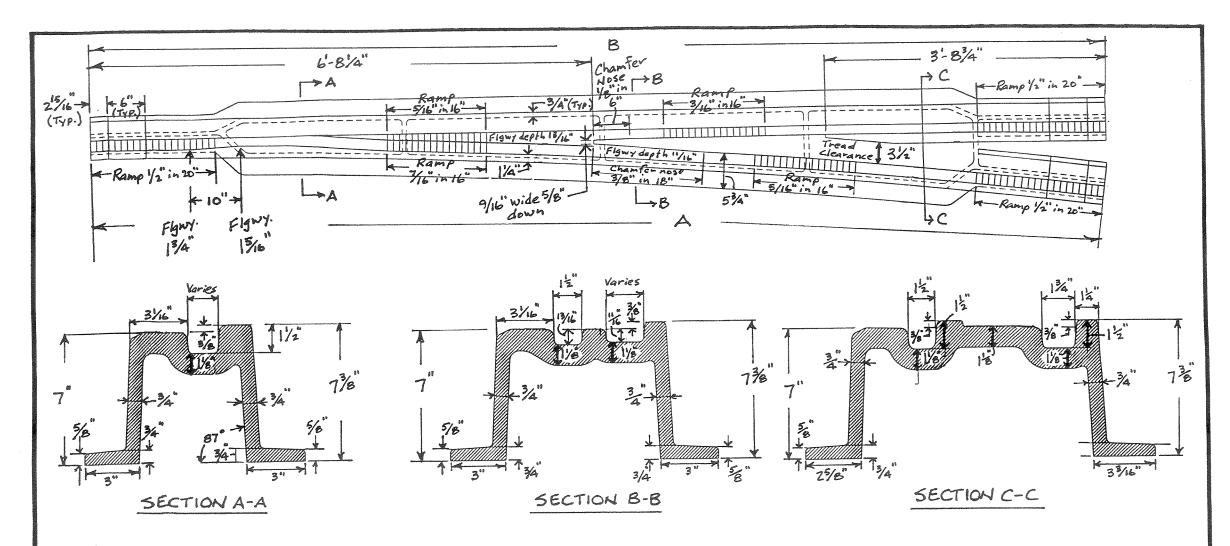
GIRDER RAIL SPECIAL TRACKWORK
TONGUE SWITCH SECTIONS

Mgr. Track Engineering

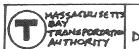
Director-M.O.W.







- O Refer to Plan No. 7042 for additional point mate details.
- 3 All joint drilling to be 1/4" diameter holes, 3" above base, spacing as indicated.
- 3 Dimensioning shown representative of 100'CR geometry. Different geometric requirements will pecessitate recalculation of many dimensions shown on this drawing.
- @ This drawing shows 149 RETA mil section.
- 3 Refer to Plan Nos. 700,701,702 and 703 for girder rail special trackwork and details.
- O Refer to specification for Girder Rail Special Trackwork in the Book of Standard Track Material/Construction Specs.



M.O.W. DIVISION

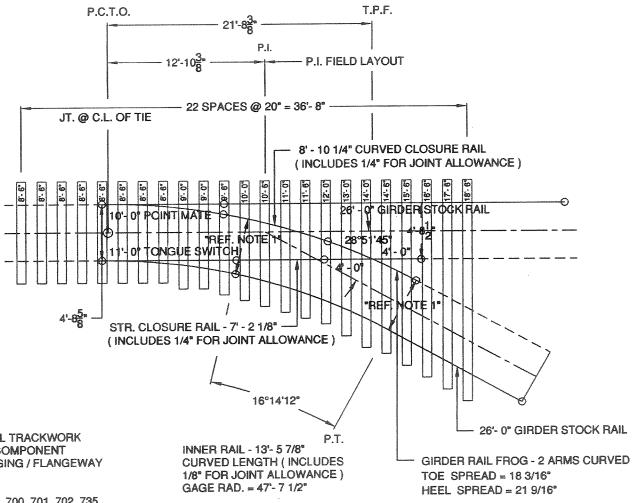
1554 E

GIRDER RAIL SPECIAL TRACKWORK
POINT MATE SECTIONS

POINT MATE SECTIONS AND DETAILS

Mgr. Track Engineering

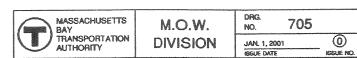
Director-M.O.W.



- REFER TO GIRDER RAIL SPECIAL TRACKWORK DESIGN SPECIFICATIONS FOR COMPONENT FABRICATION DETAILS AND GAGING / FLANGEWAY CRITERIA.
- 2.) REFER TO MBTA DRAWING NOS. 700, 701, 702, 735, 740, 741, 745, AND 750 FOR DATA AND DETAILS RELATED TO GIRDER RAIL SPECIAL TRACKWORK.

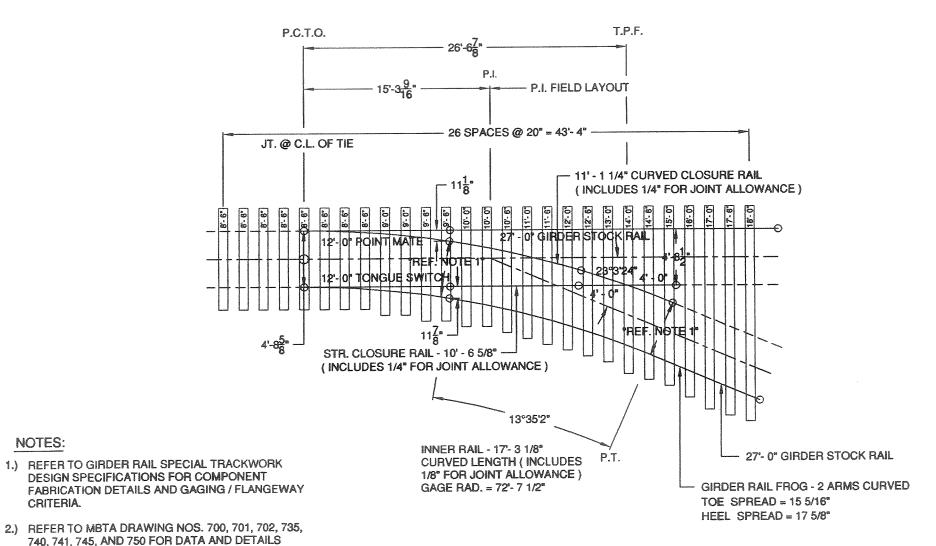
## 50' C.R. GIRDER RAIL TURNOUT

SCALE: 1/8" = 1'- 0"



LRT GIRDER RAIL SPECIAL TRACKWORK 50' C.R. TURNOUT

MGR. TRACK ENGINEERING DIRECTOR - M.O.W.

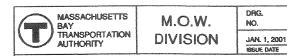


#### RELATED TO GIRDER RAIL SPECIAL TRACKWORK. 75' C.R. GIRDER RAIL TURNOUT

NOTES:

CRITERIA.

SCALE: 1/8" = 1'- 0"

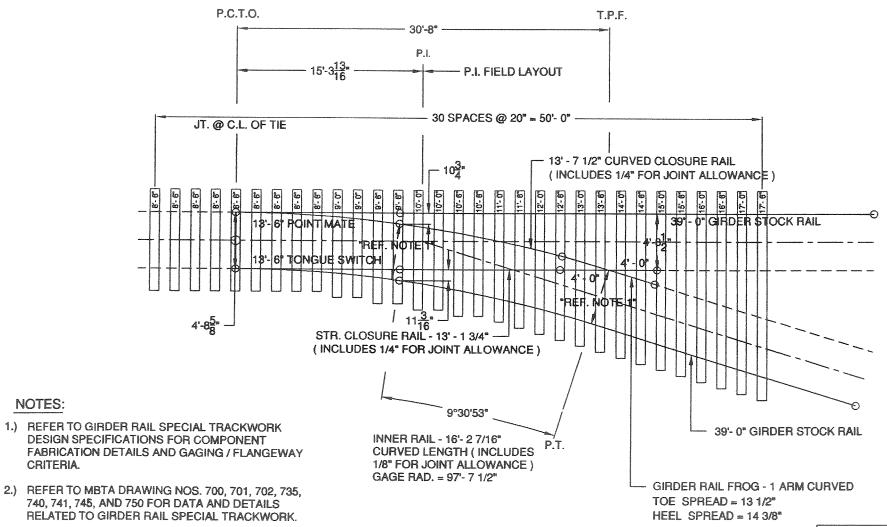


LRT GIRDER RAIL SPECIAL TRACKWORK 75' C.R. TURNOUT

710

ISSUE NO.

MGR. TRACK ENGINEERING DIRECTOR - M.O.W.



100' C.R. GIRDER RAIL TURNOUT (TYPE "A")

NOTES:

CRITERIA.

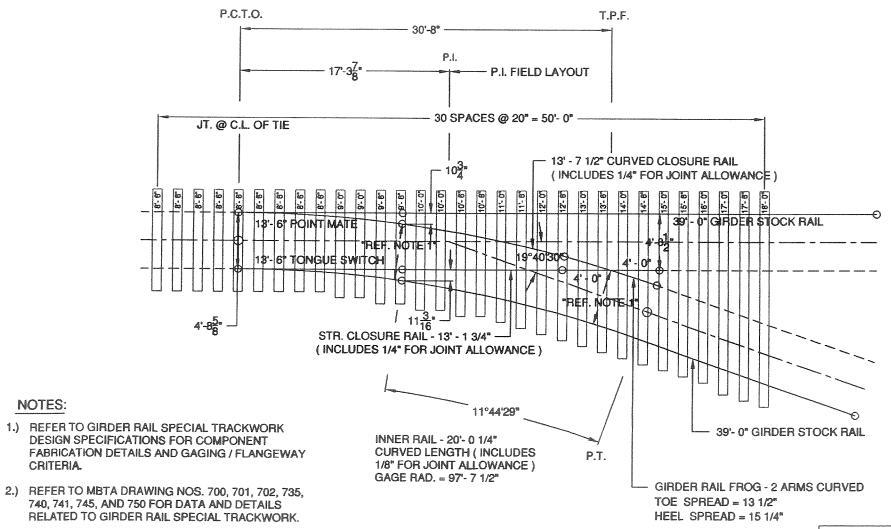
SCALE: 1/8" = 1'- 0"

MASSACHUSETTS TRANSPORTATION AUTHORITY

M.O.W. DIVISION DRG. 715 0 JAN. 1, 2001 ISSUE NO.

LRT GIRDER RAIL SPECIAL TRACKWORK 100' C.R. TYPE "A" TURNOUT

MGR. TRACK ENGINEERING



CRITERIA.

100' C.R. GIRDER RAIL TURNOUT

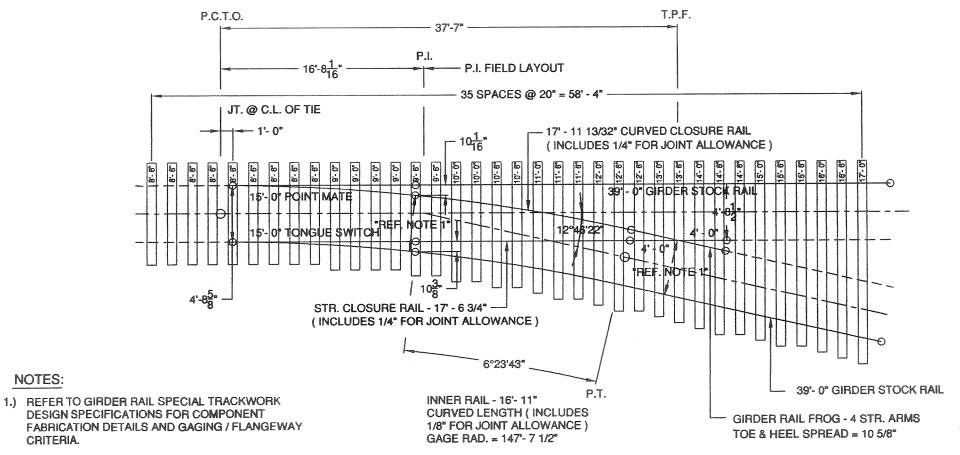
SCALE: 1/8" = 1'- 0"



M.O.W. DIVISION DRG. 720 NO. 0 JAN. 1, 2001

LRT GIRDER RAIL SPECIAL TRACKWORK 100' C.R. TYPE "B" TURNOUT

MGR. TRACK ENGINEERING



#### 2.) REFER TO MBTA DRAWING NOS. 700, 701, 702, 735, 740, 741, 745, AND 750 FOR DATA AND DETAILS

NOTES:

CRITERIA.

RELATED TO GIRDER RAIL SPECIAL TRACKWORK.

## 150' C.R. GIRDER RAIL TURNOUT

SCALE: 1/8" = 1'- 0"

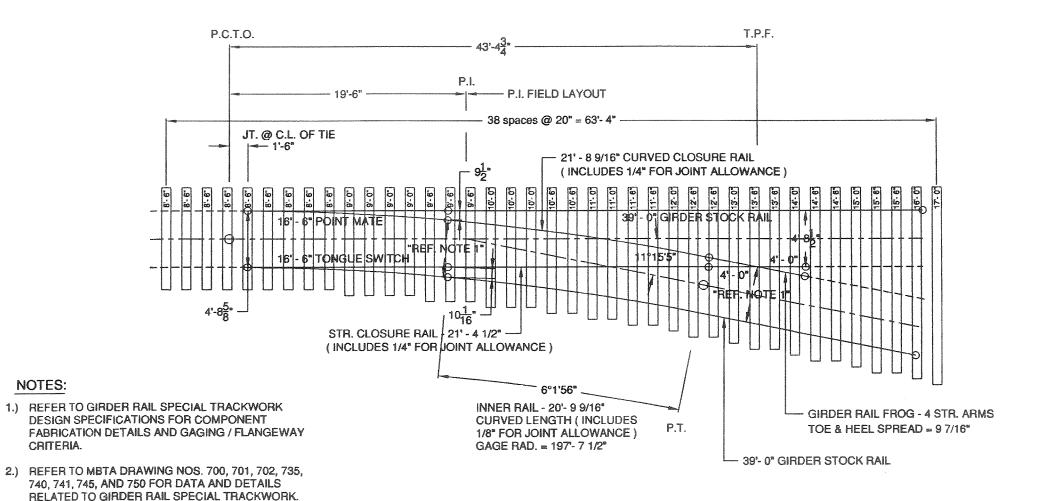


725 M.O.W. DIVISION JANL 1, 2001 IGSUE DATE

LRT GIRDER RAIL SPECIAL TRACKWORK 150' C.R. TURNOUT

ISSUE NO.

MGR. TRACK ENGINEERING



### 200' C.R. GIRDER RAIL TURNOUT

NOTES:

SCALE: 1/8" = 1'- 0"

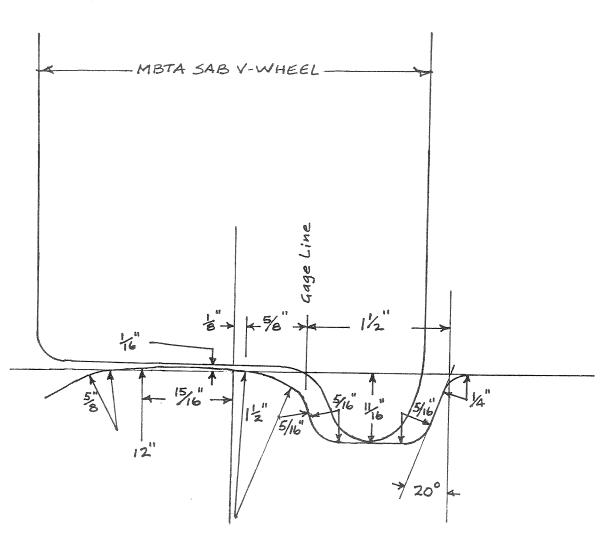


DRG. M.O.W. NO. DIVISION

730 JAN. 1, 2001

LRT GIRDER MAIL SPECIAL TRACKWORK 200' C.R. TURNOUT

MGR. TRACK ENGINEERING



Representation is Full-Size

#### NOTES:

Oflange bearing geometry conforms to A.T. E.A. Standard.

ORefer to Drawing No. 750 for details of SAB V-wheel.

® Refer to Girder Rail Special Trackwork Drawings, solid manganese frog details and other associated drawings in the M.O.W. Division Book of Standard Trackwork Plans.

@ Refer to Girder Rail Special Trackwork Design Specification in the MBTA M.O.W. Division Book of Standard Track Makerial Specs.



M.O.W. DIVISION

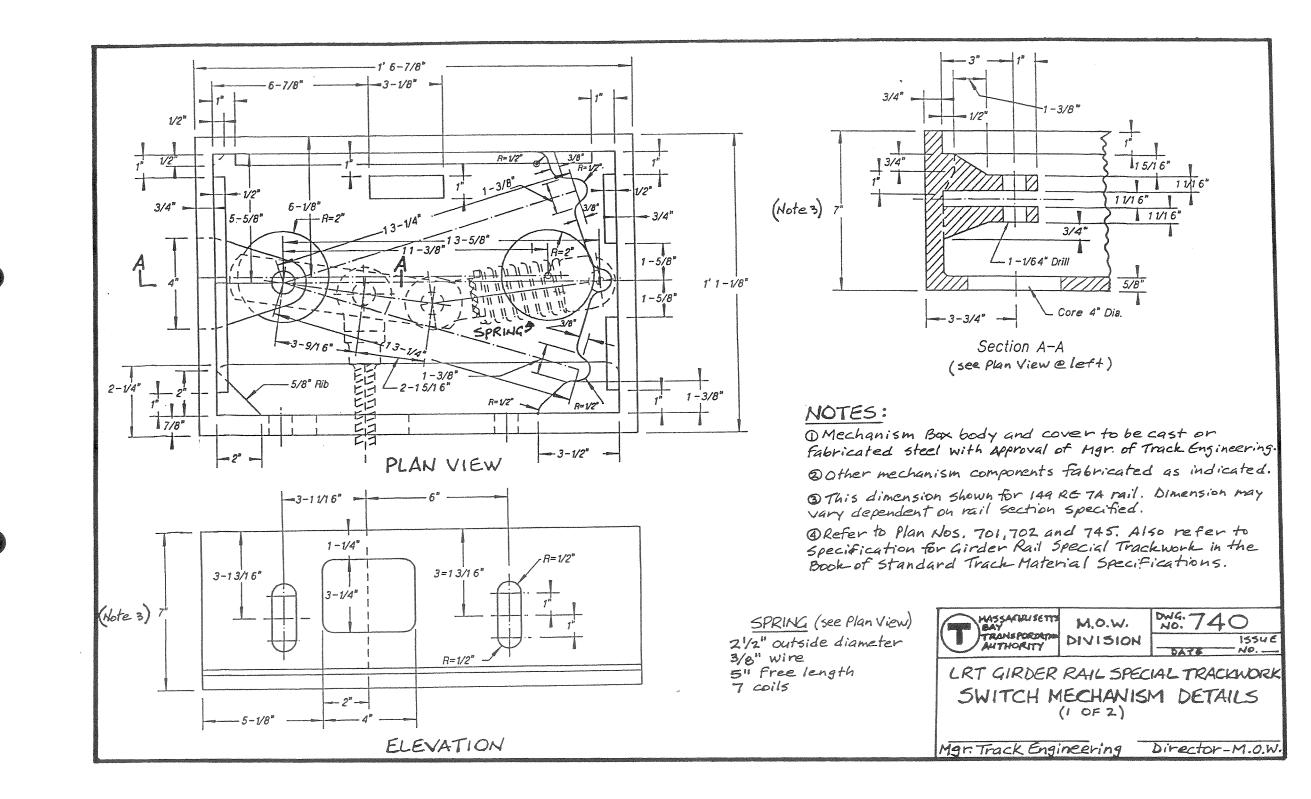
DWG: 735

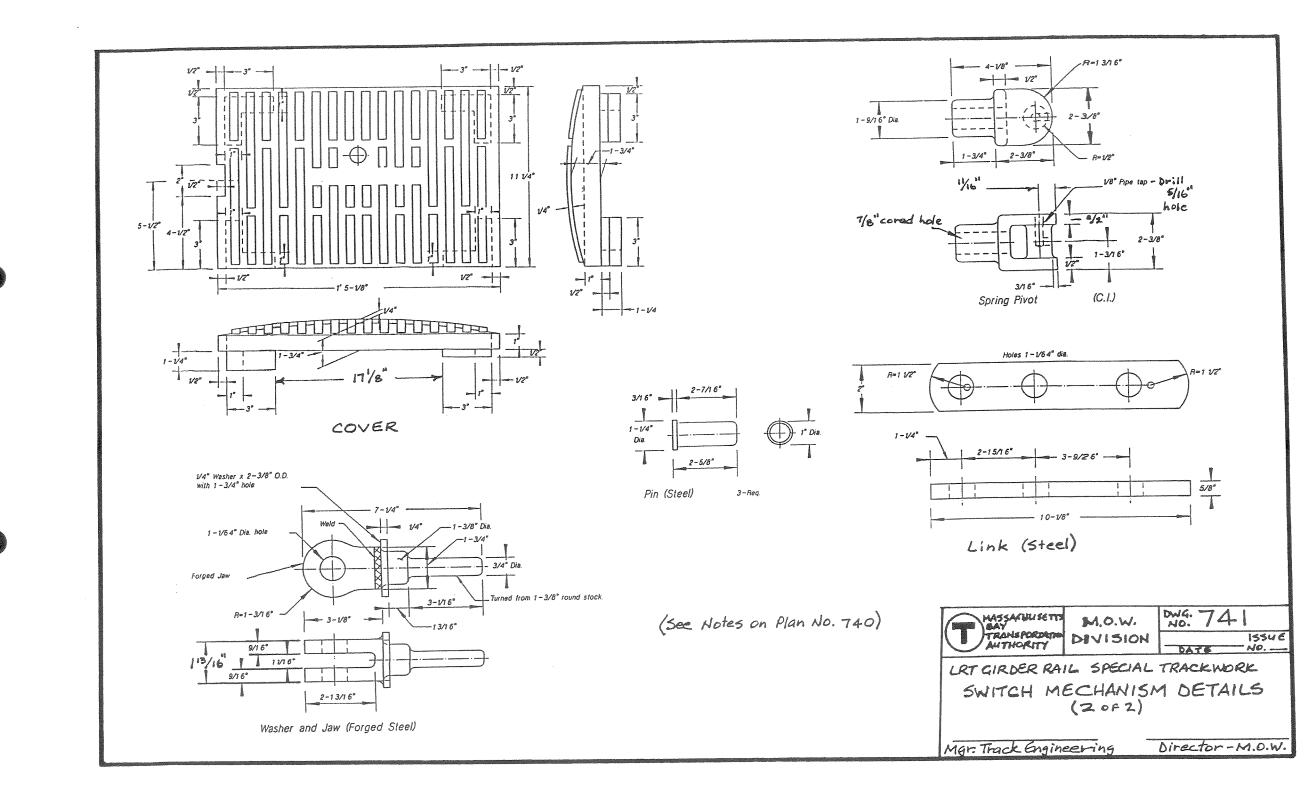
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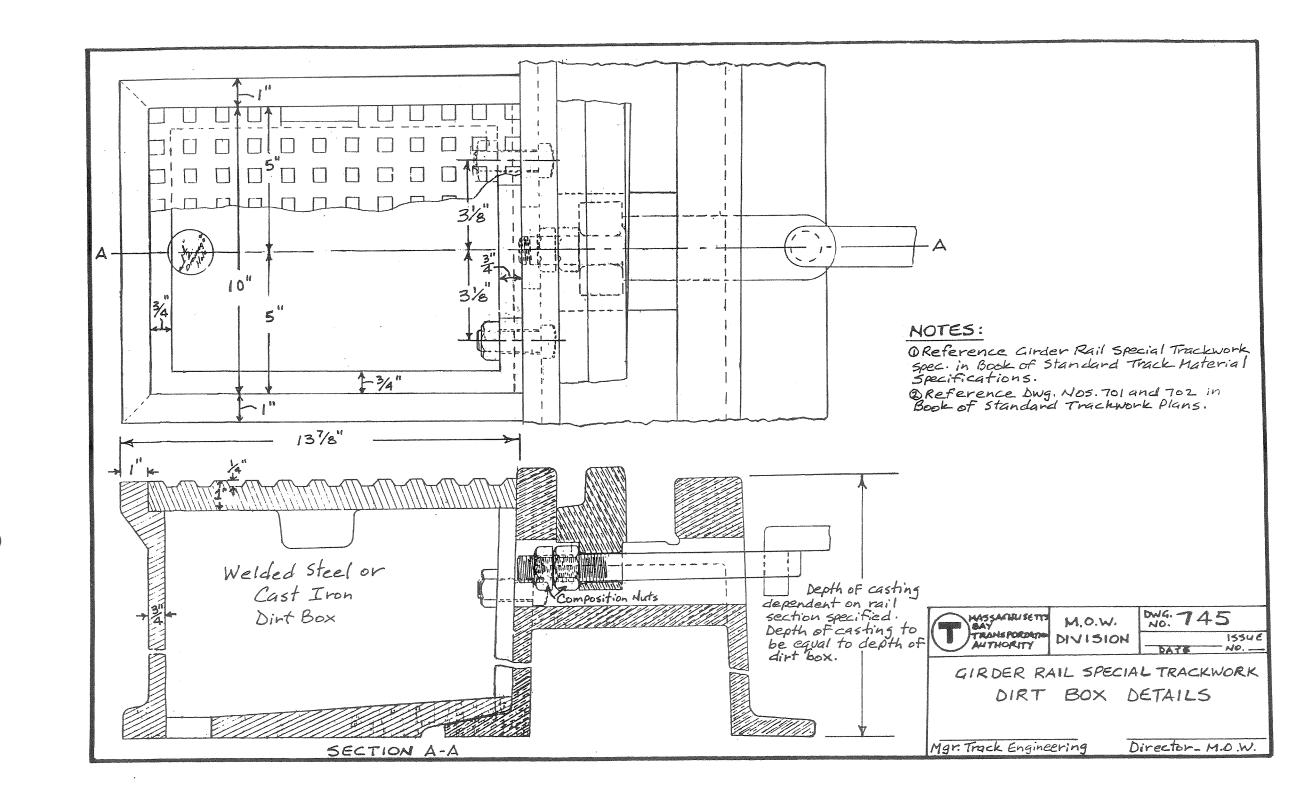
LRT-FLANGE BEARING DETAILS

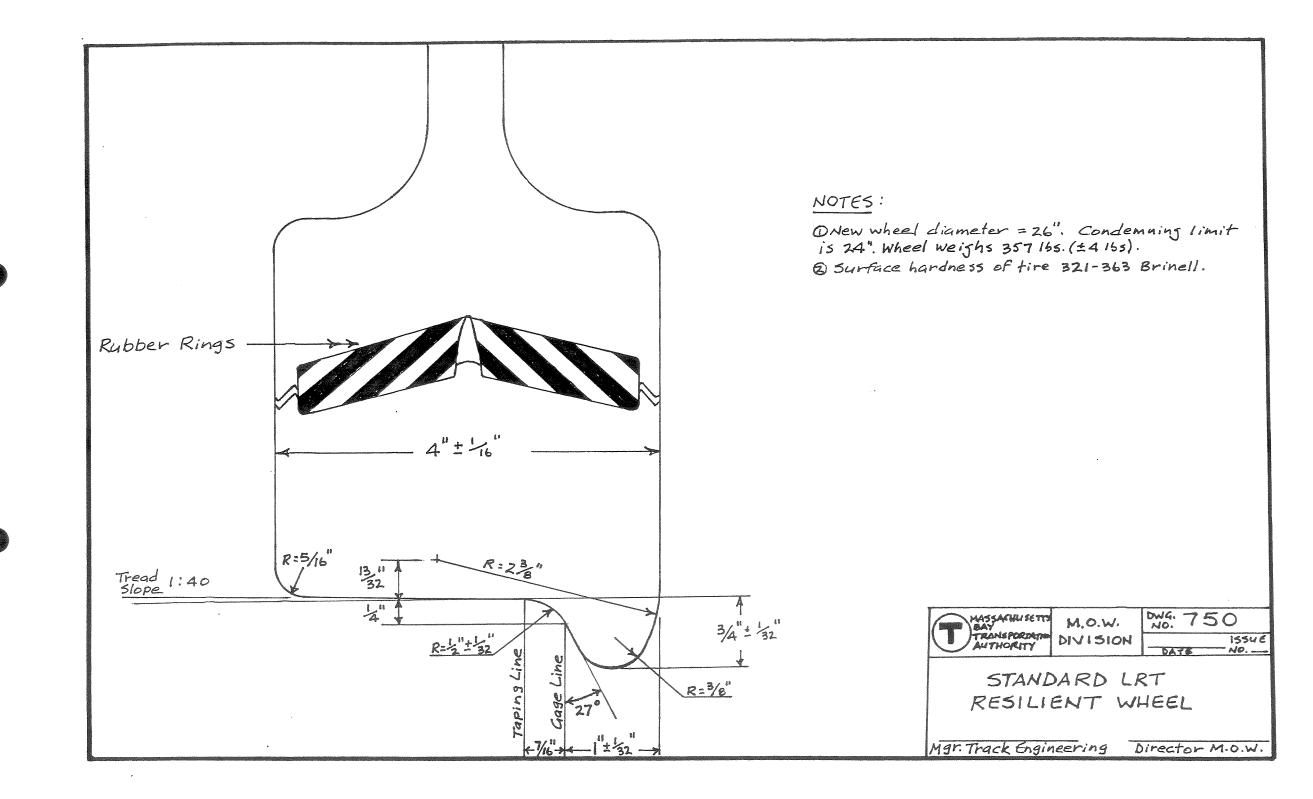
Mgr. Track Engineering

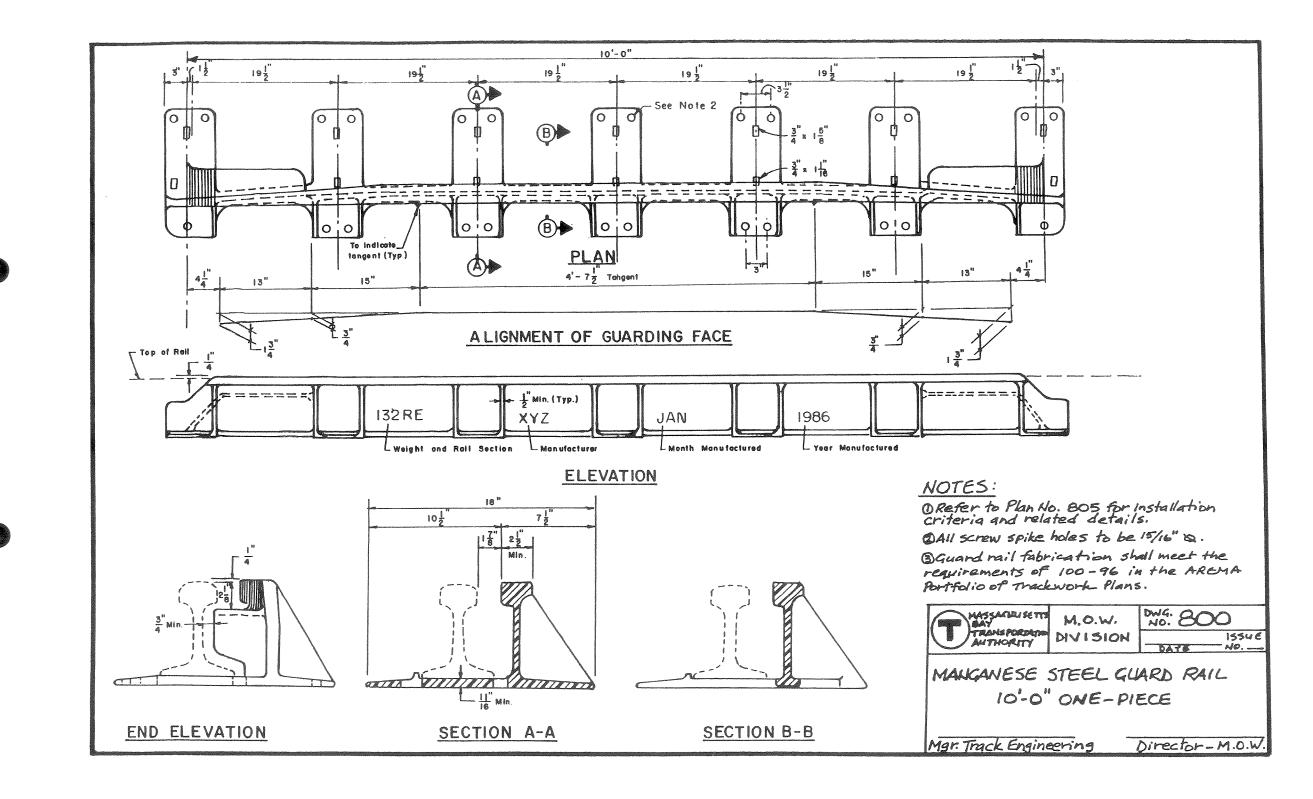
Director-M.O.W.

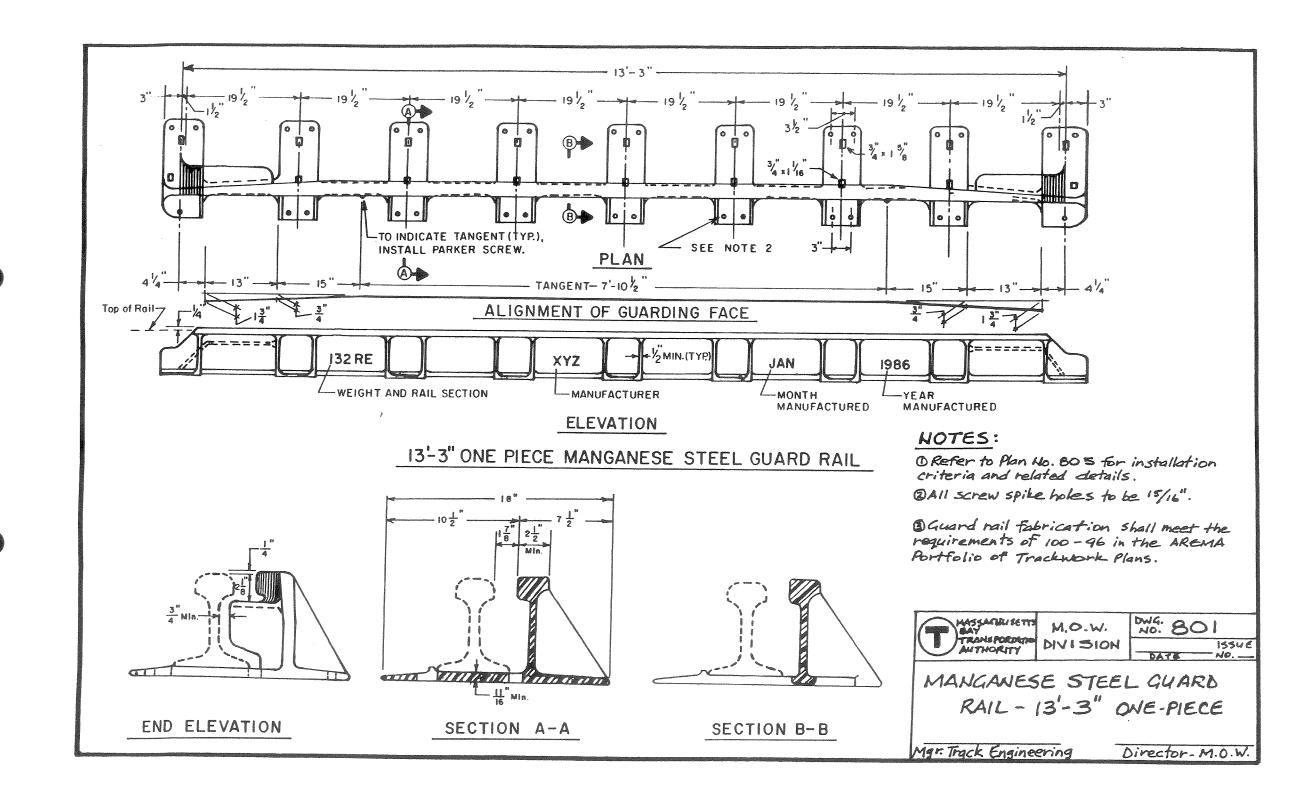


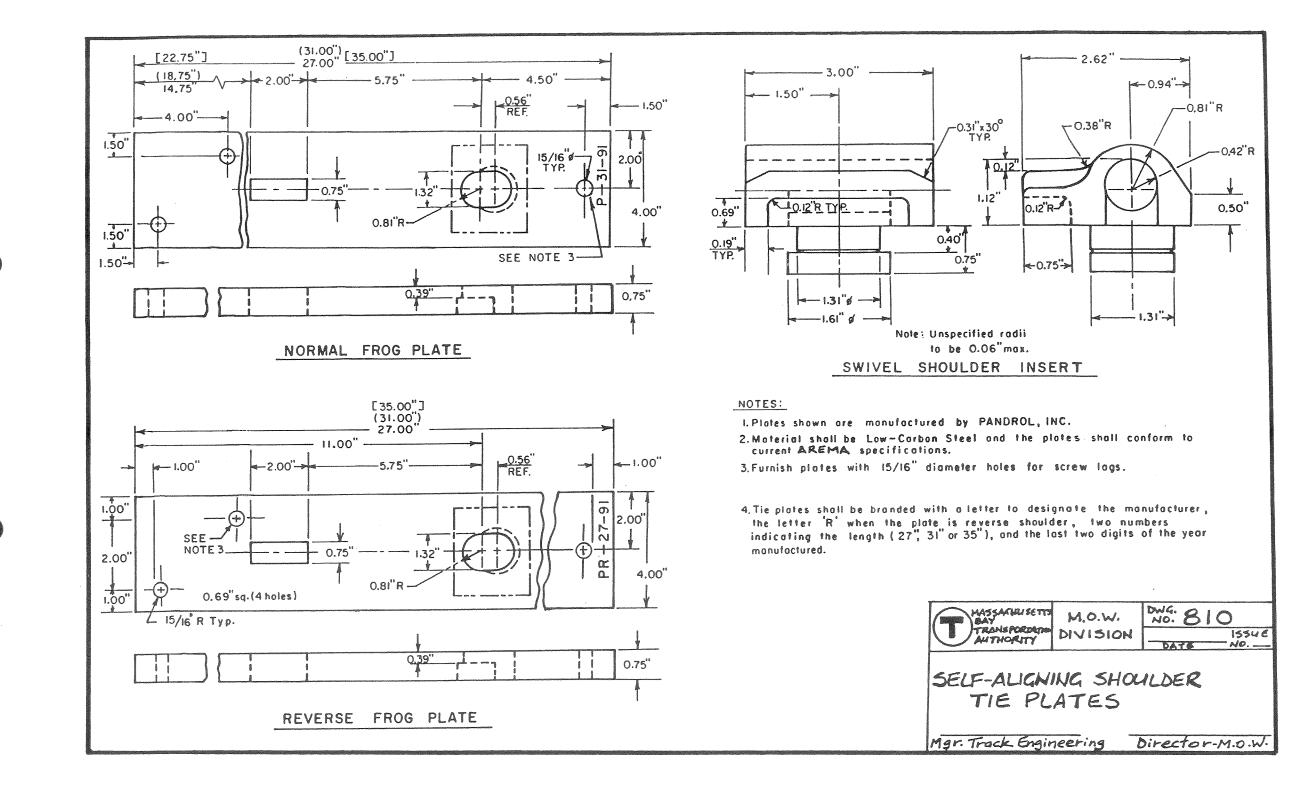


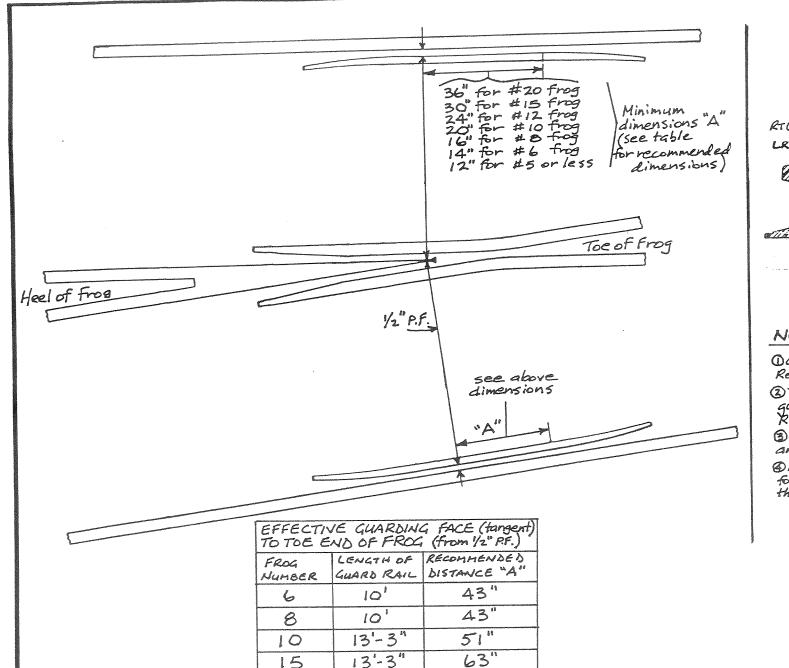








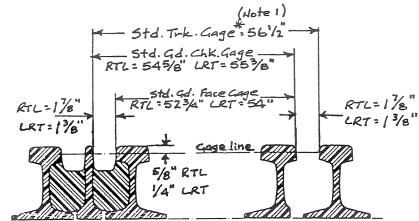




13-3"

20

63"



TRACK AND GUARD RAIL GAGE DATA

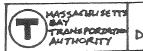
#### NOTES:

OGage may vary in curved side of turnouts. Refer to Special Trackwork Plans for details.

3 Track must be installed ± 1/8" from standard quard check and guard face gages as indicated REGARDLESS OF TRACK GAGE.

3 Guard rail Fabrication per Plan Nos. Boo and Bol and 100-96 in the AREMA Portfolio of Trackwork Plans.

ORefer to M.O.W. Div. Track Main tenance Standards for guard check and guard face gage maintenance thresholds.

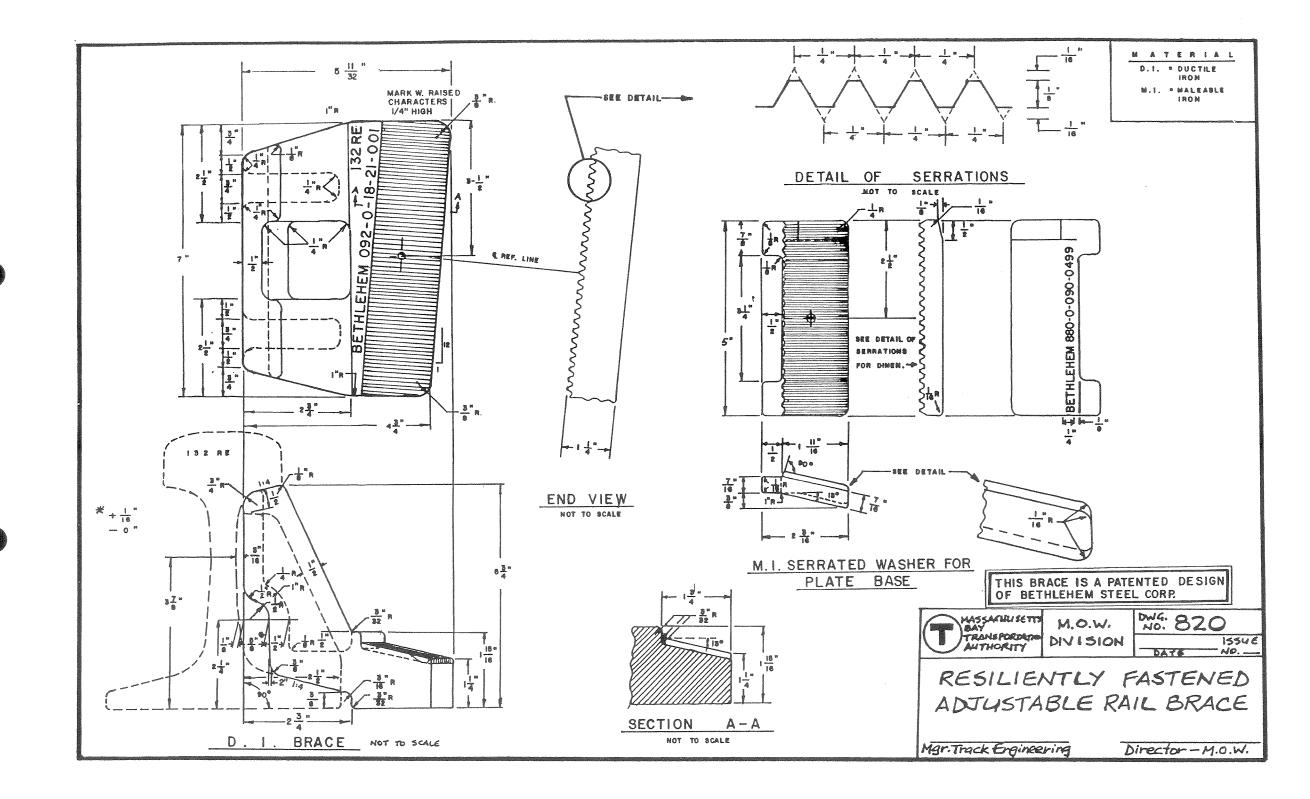


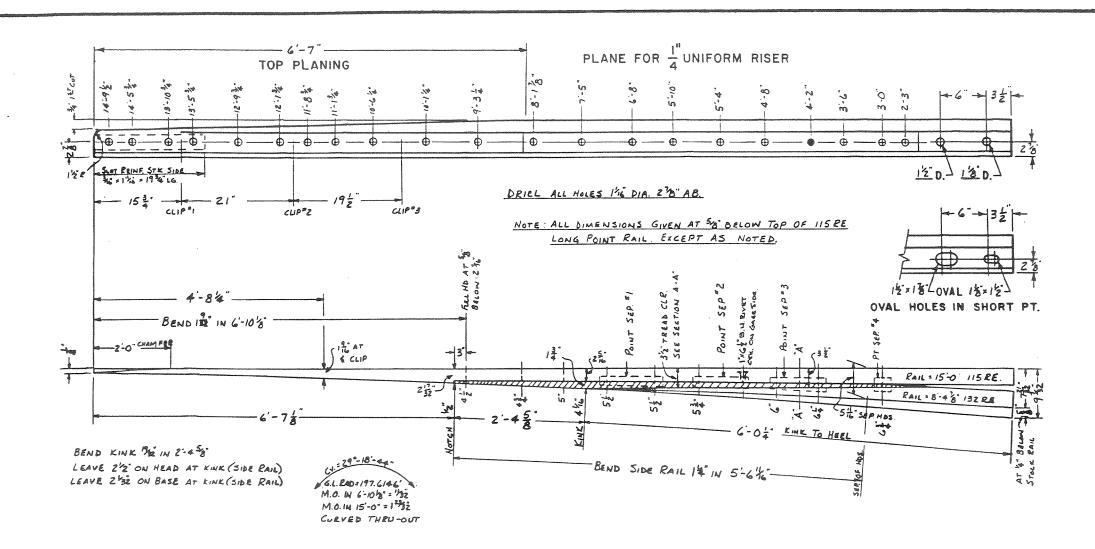
M.O.W. DIVISION MG: 805 1554E

ONE-PIECE GUARD RAIL
INSTALLATION CRITERIA

Mgr. Track Engineering

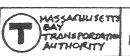
Director-M.O.W.





- OReference Specification for 115 RE Guarded Special Trackwork in the Book of Standard Track Material and Construction Specifications.
- @ Reference MBTA Plan NOS. 410,411, B26, 830, 835, 840 and any other applicable Plans and Specifications.
- @ Switch throw as indicated in Spec. for 115 RE Gold Sp. Trkwk.
- @ Switch points fully heat-treated to 321-388 Brinell.

DETAILS SHOWN ARE FOR 200'RADIUS SWITCH IN LRT TRACK. DIFFERENT GEOMETRY WILL NECESSITATE RE-CALCULATION OF EACH DIMENSION SHOWN. NOTE FLANGEWAY DIFFERENTIAL BETWEEN RIL AND LRT TRACK.

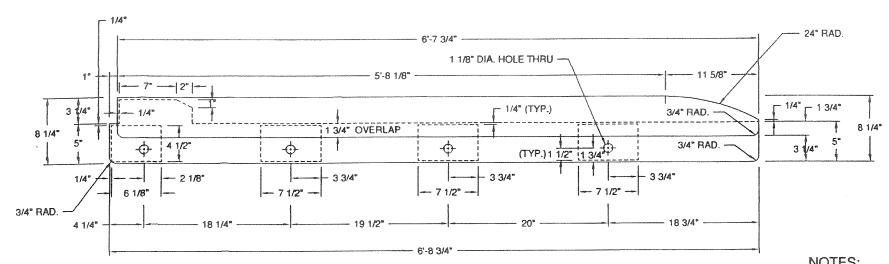


M.O.W. DIVISION 1554E

GUARDED SWITCH POINT DESIGN DETAILS

Mgr. Track Engineering

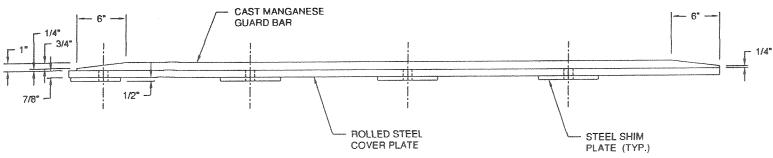
Director M.O.W.



#### **PLAN VIEW**

SCALE: 1" = 1'-0"

LEFT HAND AS SHOWN RIGHT HAND OPPOSITE



**ELEVATION** 

SCALE: 1" = 1'-0"

#### NOTES:

- 1. GUARD BAR COMPONENT TO CONFORM TO THE A.R.E.A. SPECIFICATIONS FOR SPECIAL TRACKWORK IN THE PORTFOLIO OF TRACKWORK PLANS SECTION 100-96, PART M-2. TORCH CUTTING TO FACILITATE FIT OF MANGANESE BAR WITH OTHER COMPONENTS IS PROHIBITED.
- 2. FINISH AND WORKMANSHIP OF ALL COMPONENTS SHALL MEET THE STANDARDS OUTLINED IN THE A.R.E.A. SPEC. 100-96.



MASSACHUSETTS TRANSPORTATION AUTHORITY

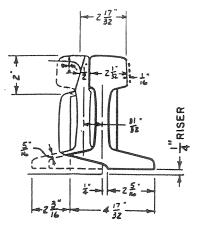
M.O.W. DIVISION

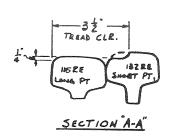
830 O) MONTH DAY, 2000 ISSUE DATE

STANDARD COVER GUARD 200' C.R. T-RAIL LEFT HAND TURNOUT

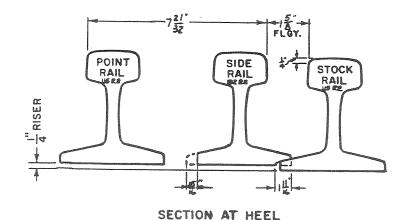
MOR TRACK ENGINEERING

DIRECTOR MOW

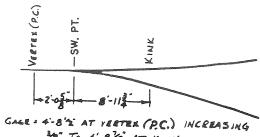




SECTION AT NOTCH



SECTIONS OF GUARDED SWITCH POINT SHOWN ON DWG. 825.



4.4-8 AT VERTER (P.C.) INCREASE

18" TO 4'-8'8" AT KINK

ALIGNMENT SKETCH

FOR GEOMETRY SHOWN

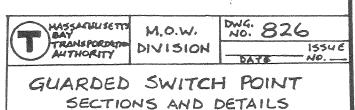
ON DWG. NO. 825

## NOTES:

OReference Specification for 115 RE Guarded Special Trackwork in the Book of Standard Track Material and Construction Specs.

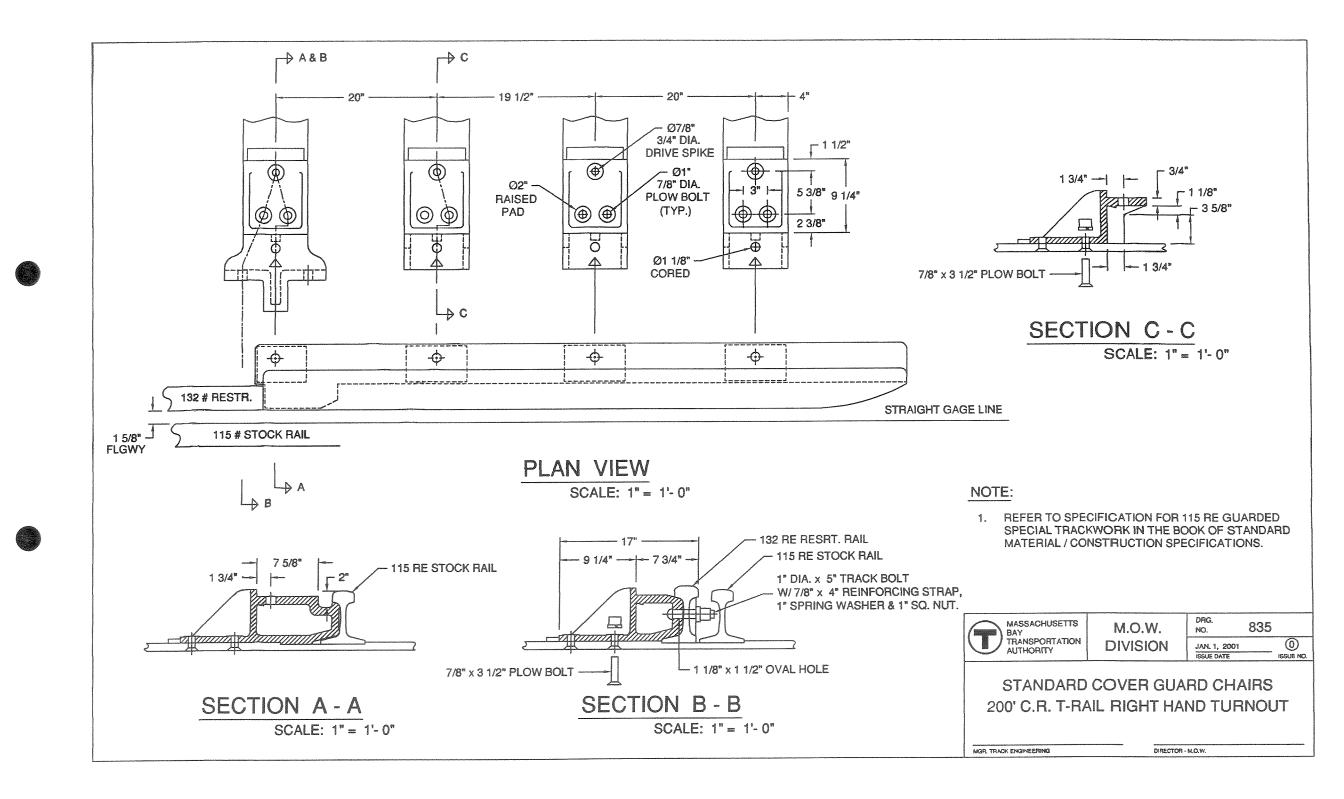
OReference Dwg. No. 825 and all other applicable drawings and specs.

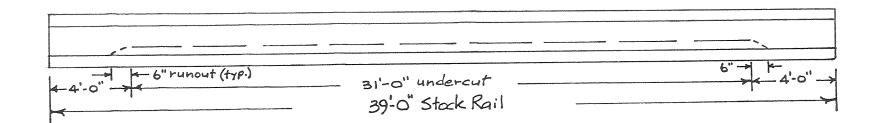
SECTIONS AND DETAILS SHOWN ARE FOR 200' RADIUS SWITCH IN LRT TRACK. DIFFERENT GEOMETRY WILL NECESSITATE RECALCULATION OF EACH DIMENSION SHOWN. NOTE GAGE, FLANGEWAY AND WHEEL TREAD CLEARANCE DIFFERENTIAL BETWEEN LRT AND RTL TRACK.



Mgr. Track Engineering

Director - M.O.W.



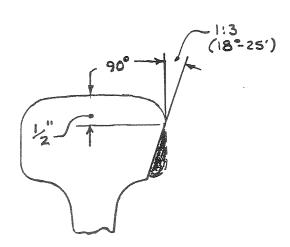


NOTES:

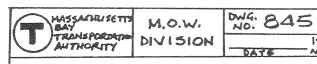
O Stock rails to be fully heat-treated per current AREMA specifications.

(2) Undercut side of rail to be opposite rail brand side of rail.

(3) Drill both ends of stock rail 31/2"-6"-6" @ 27/8" A.B., 11/8" diameter holes unless directed otherwise. No heel block drilling unless specified.



Undercut Detail

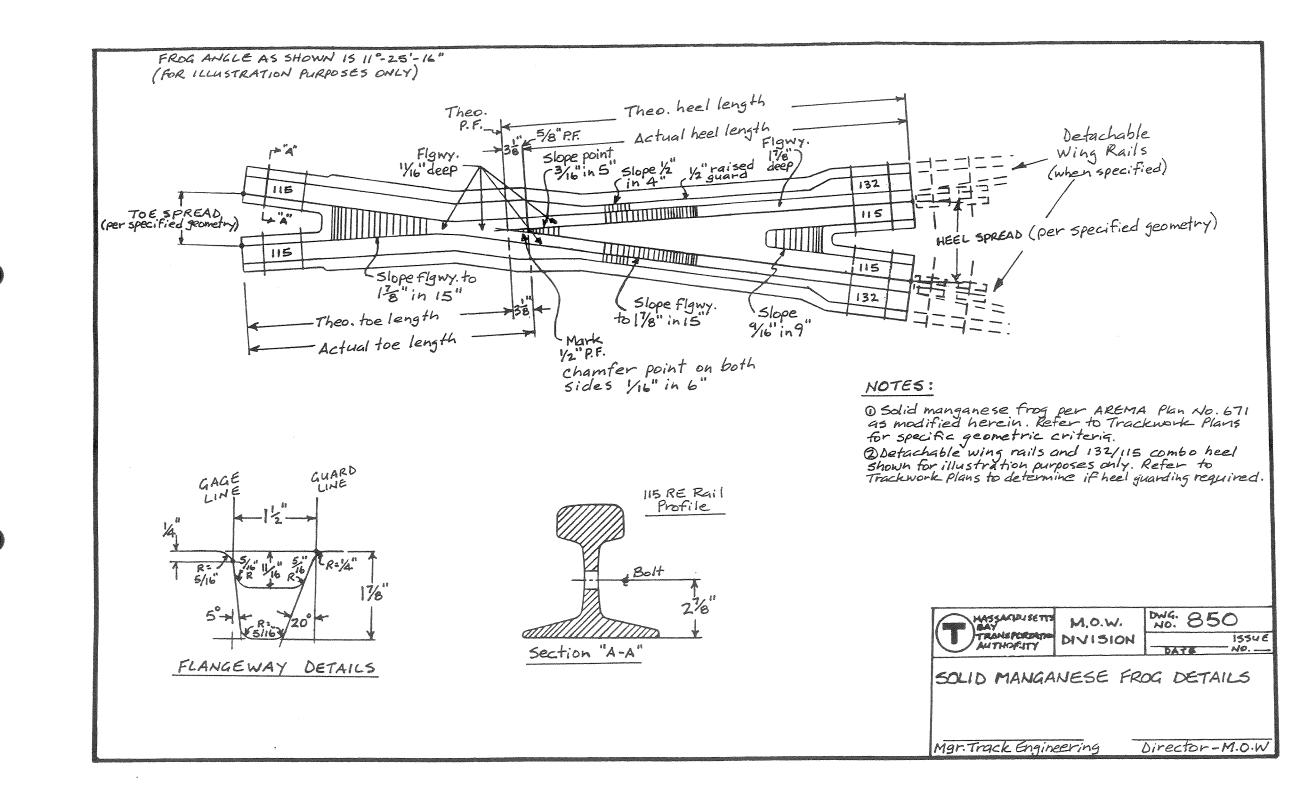


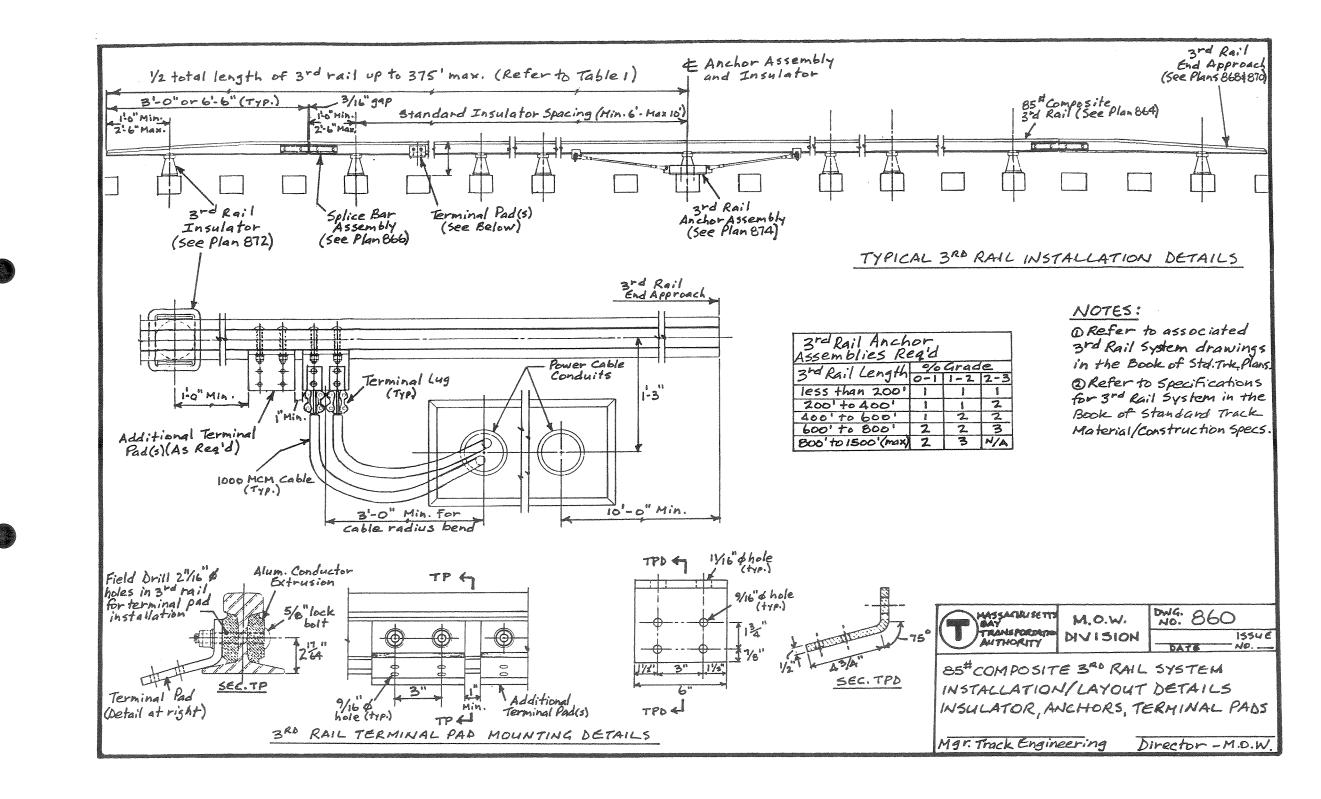
UNDERCUT STOCK RAIL DETAILS

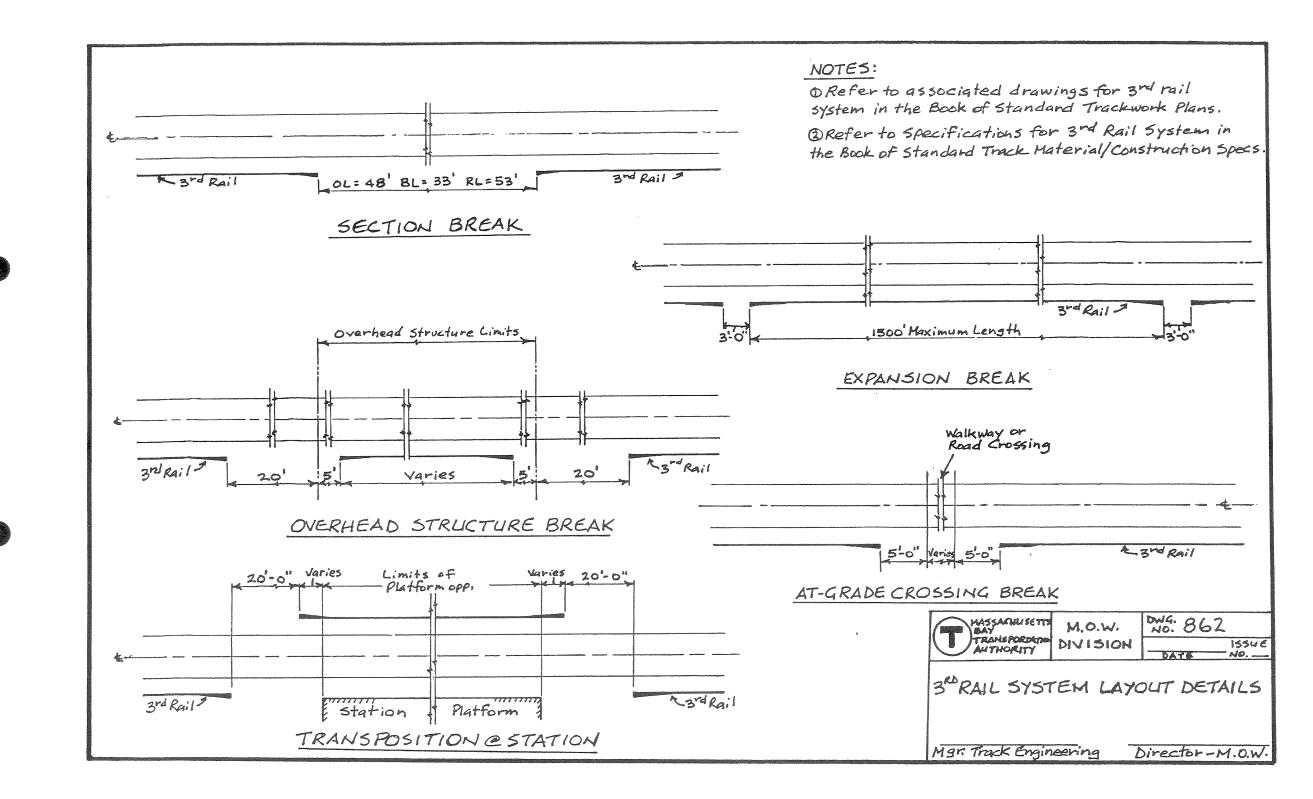
Mgr. Track Engineering

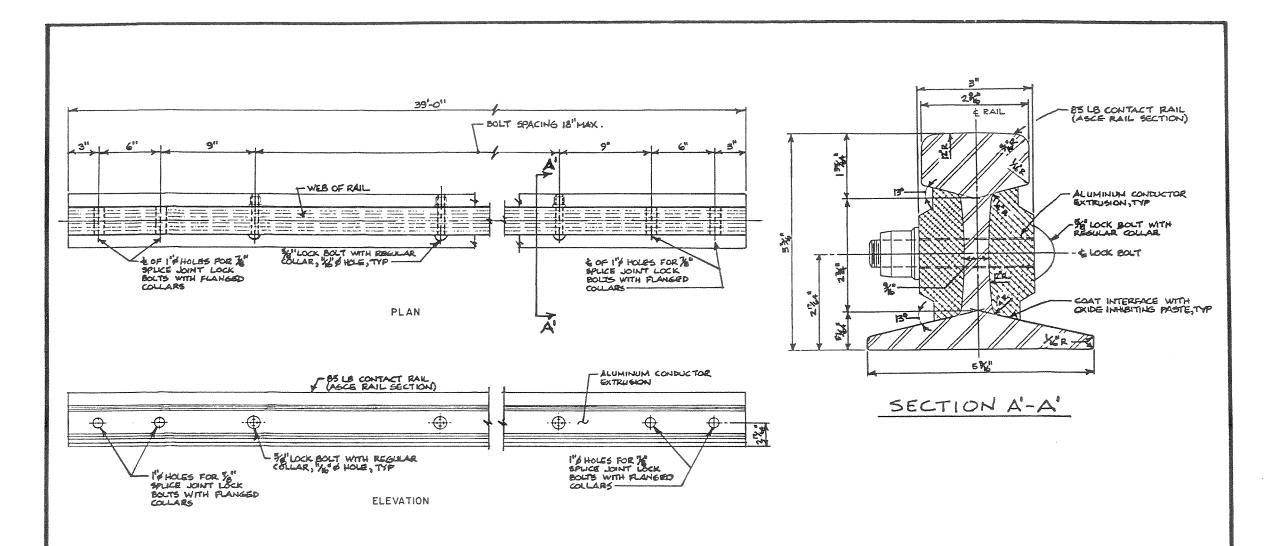
Director-M.O.W.

1554 E No. __



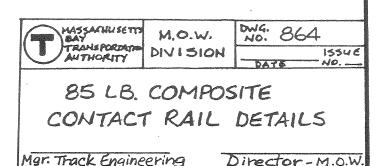


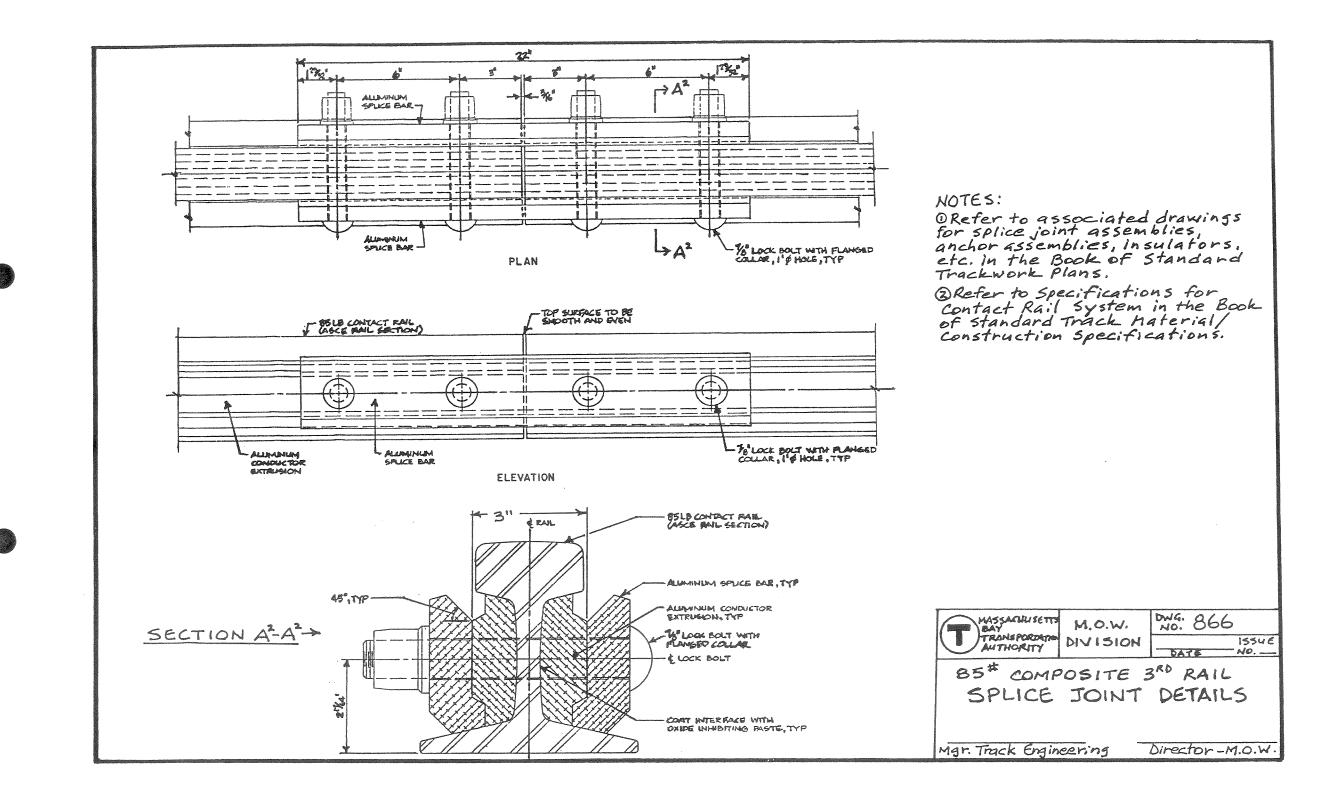


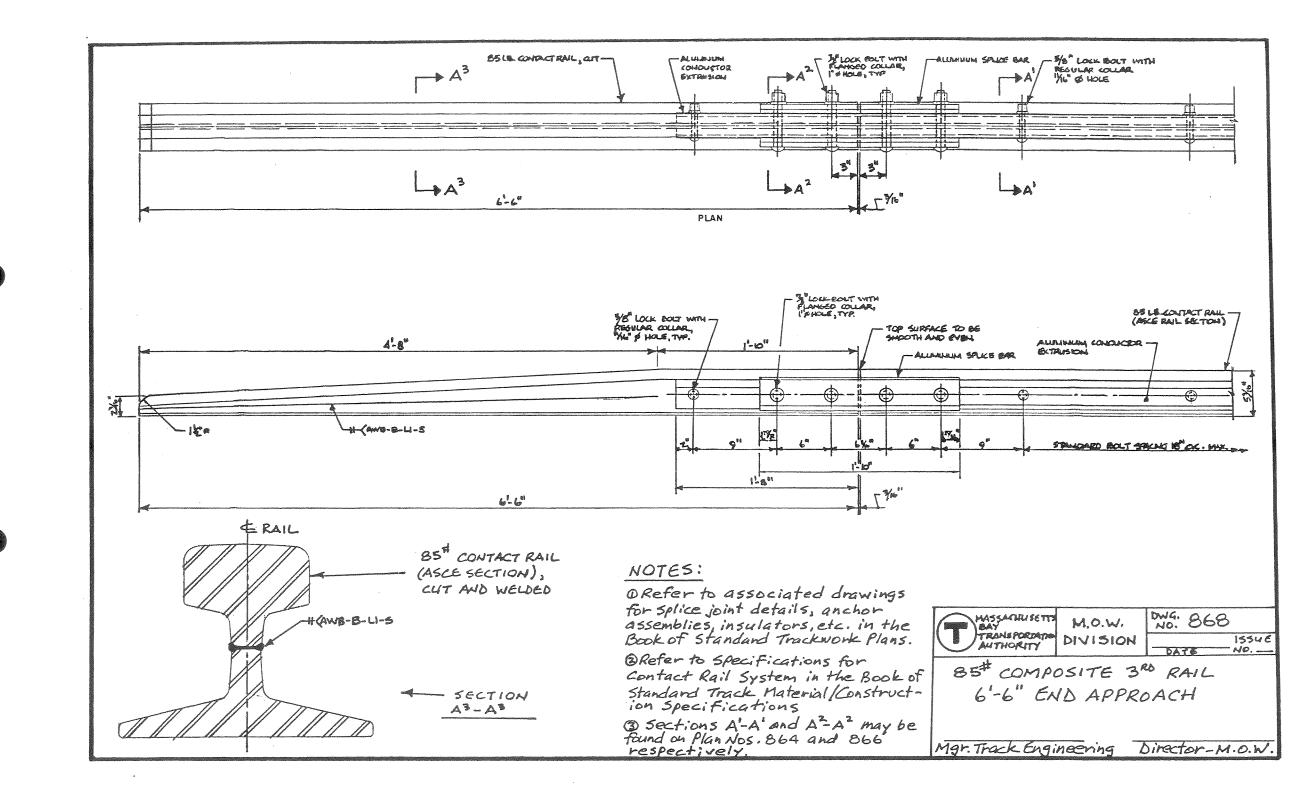


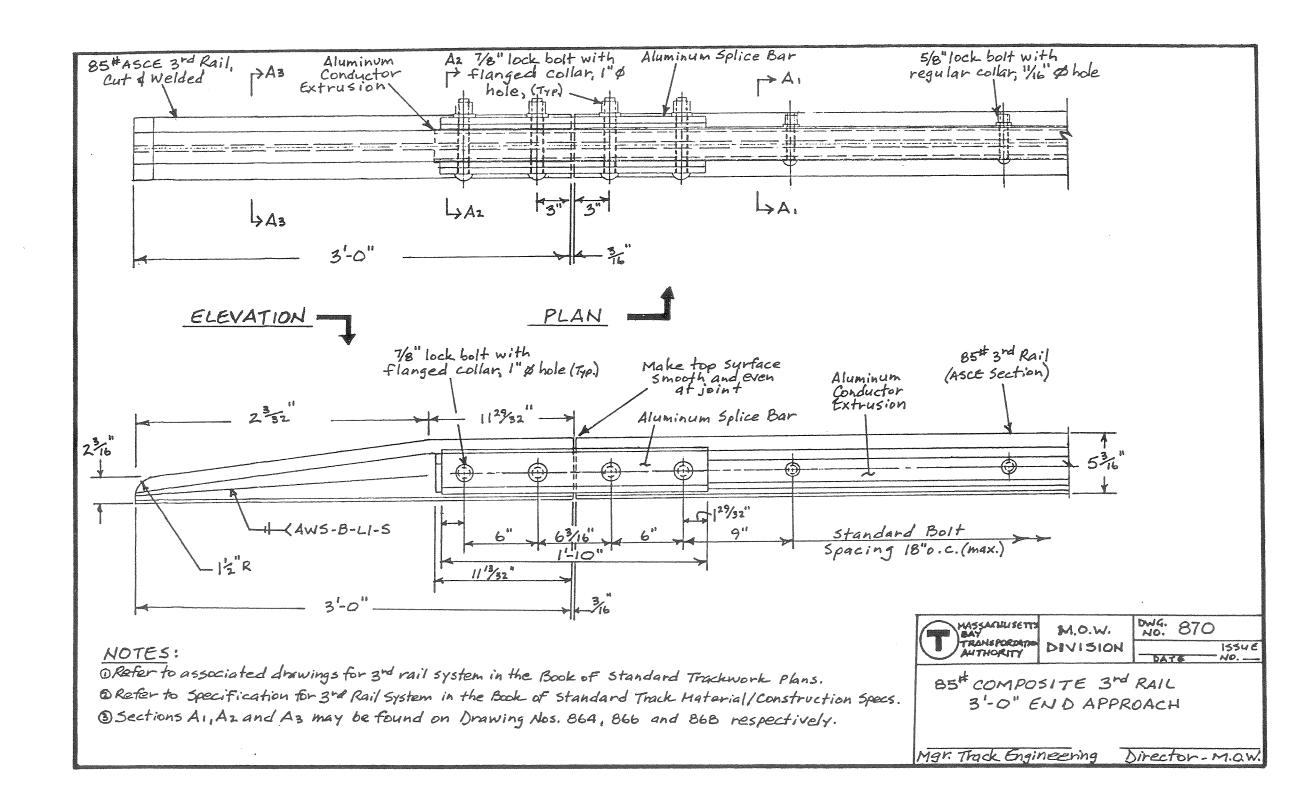
## NOTES:

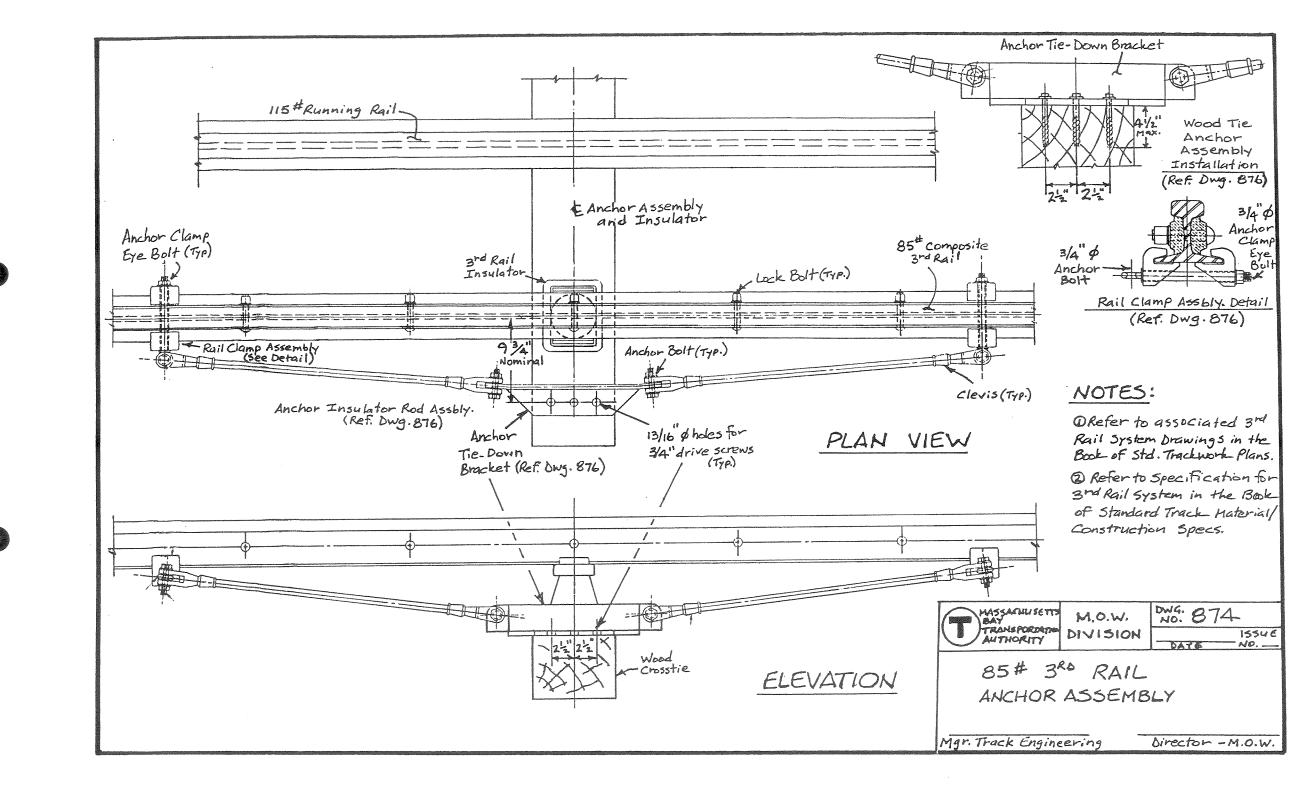
- ORefer to associated drawings for splice joint details, anchor assemblies, insulators, etc. in the Book of Standard Trackwork Plans.
- ORefer to Specifications for Contact Rail System in the Book of Standard Track Material/Construction Specifications.

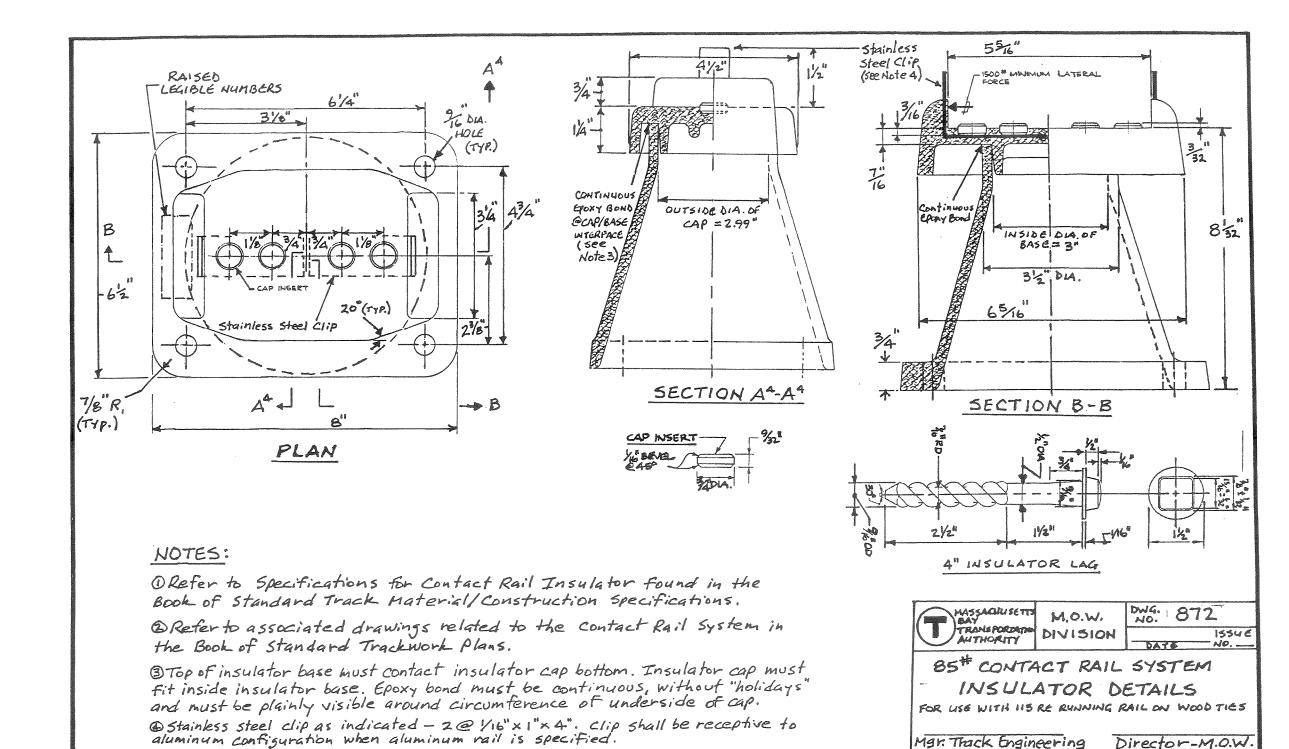






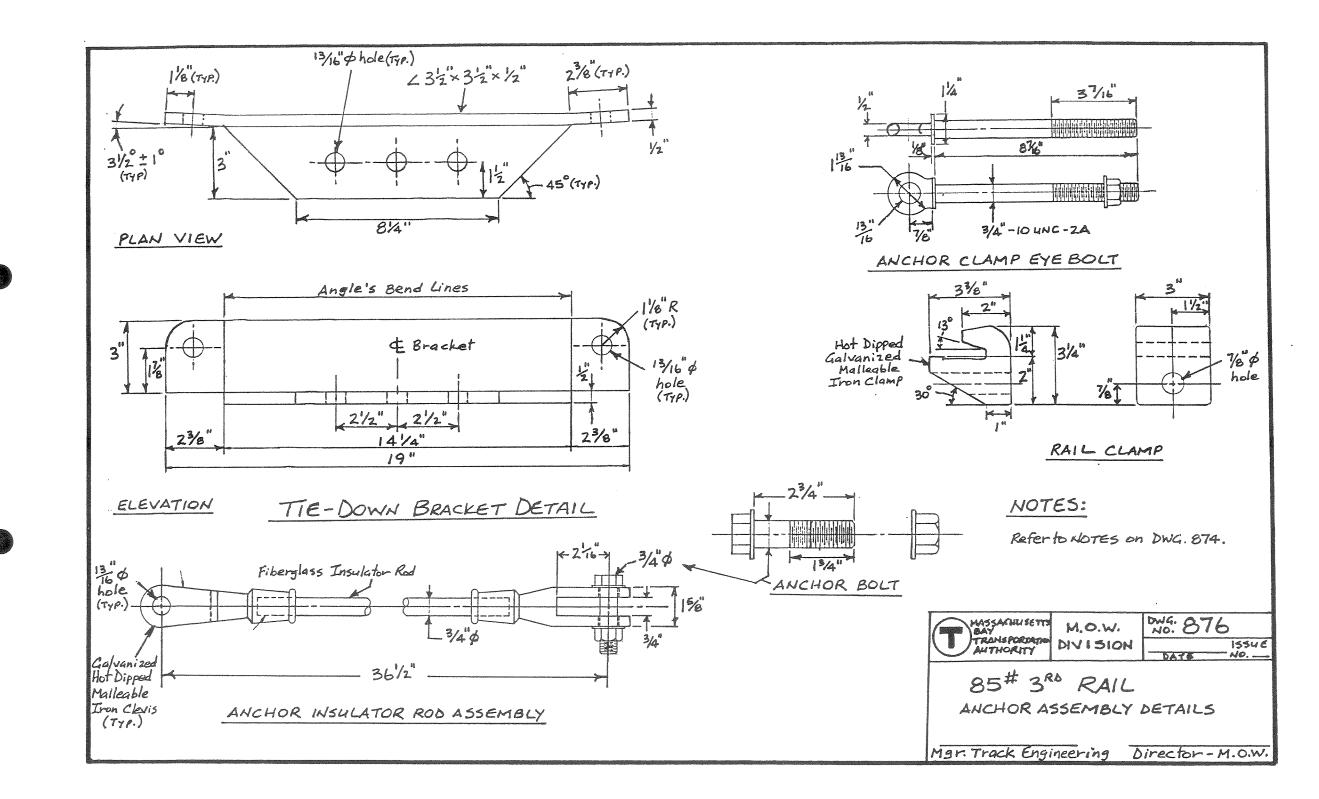


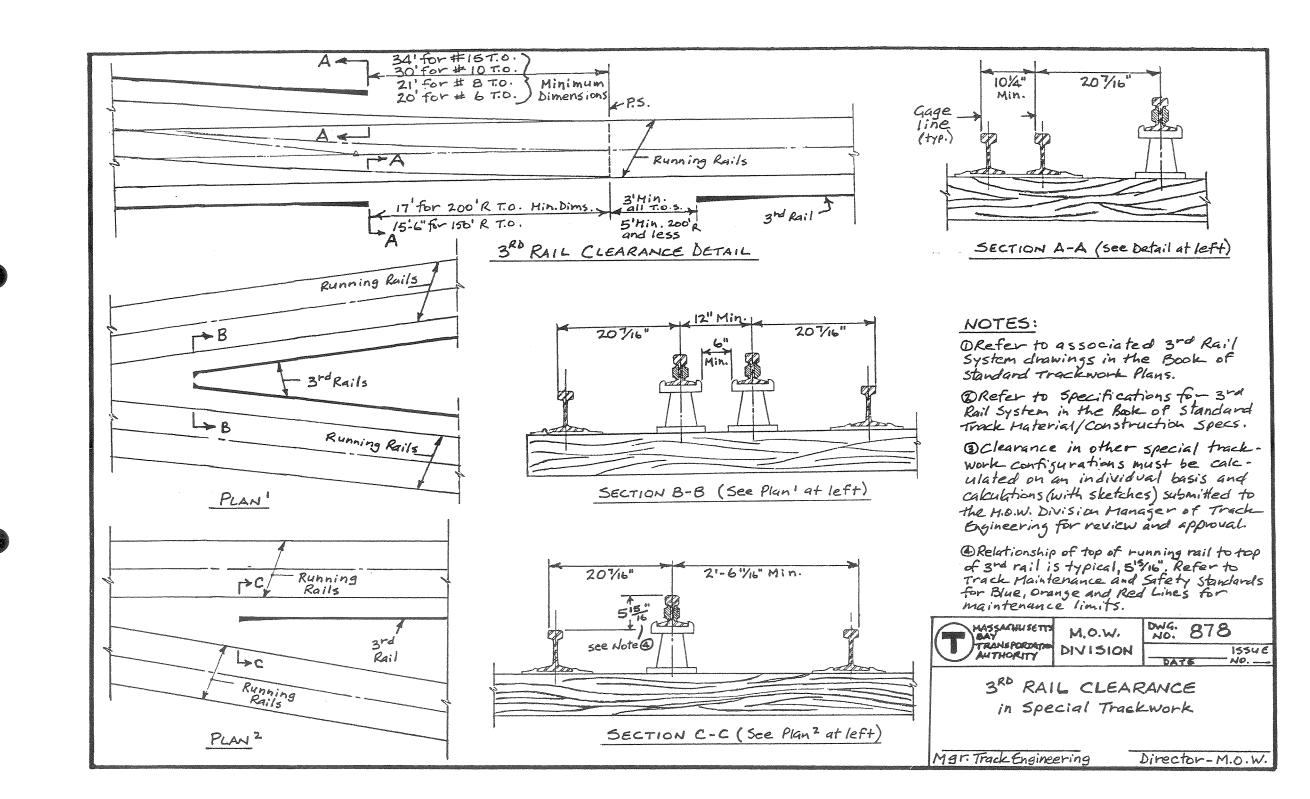


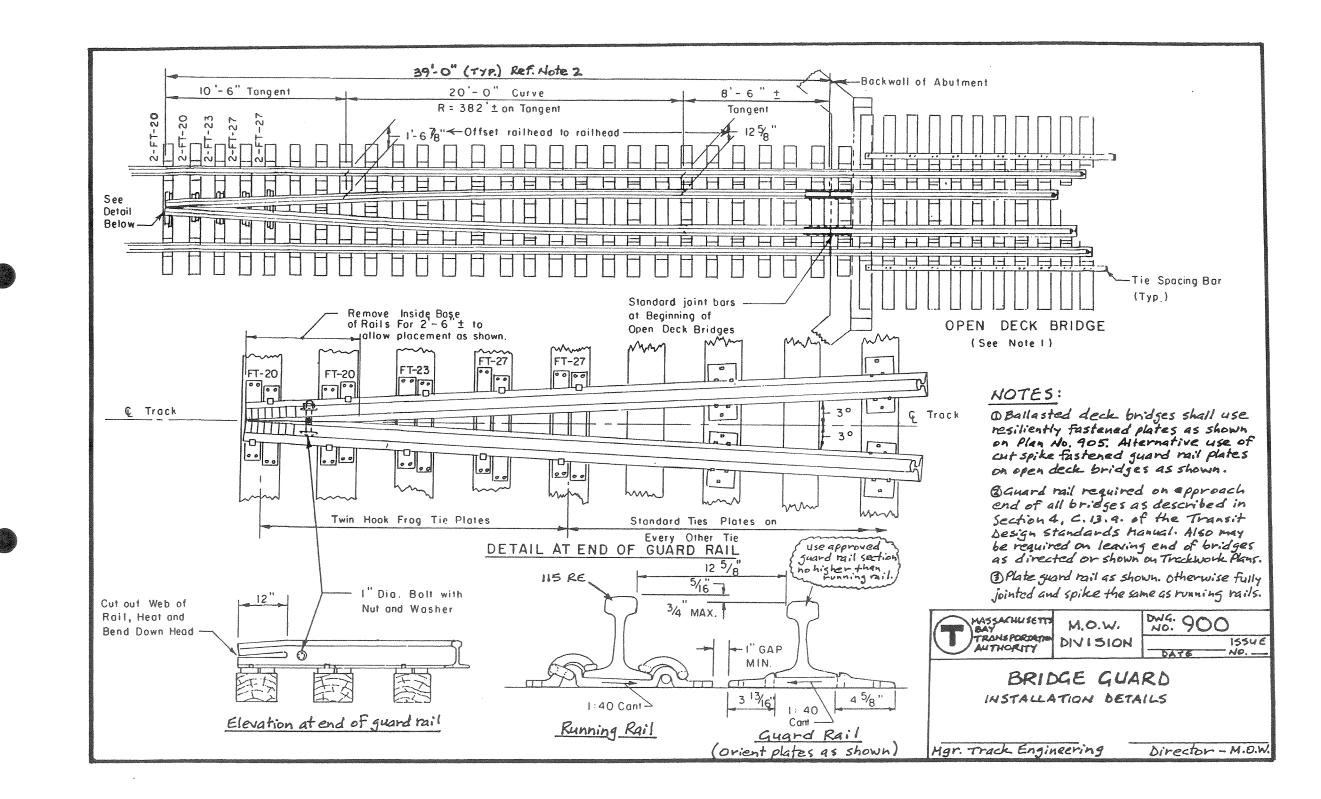


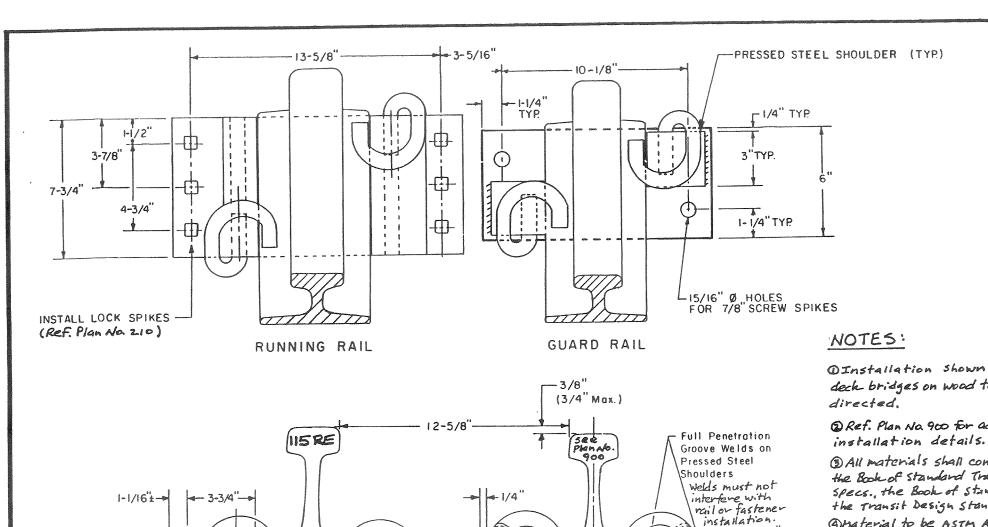
Mgr. Thack Engineering

Director-M.O.W.









12-5/8"± GUARD RAIL RAILSEAT

Pressed Steel Shoulders

Tie Plate (as shown)

Lockspikes

Fasteners

1:40 CANT --

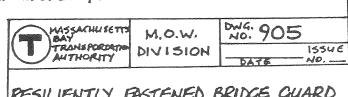
-15-3/4"±

RUNNING RAIL RAILSEAT

Tie Plate (Ref. Plan No. 225) Lockspikes (Ref. Plan No. 220)

Fasteners (Ref. Plan No. 240)

- @Installation Shown for use on ballasted dech bridges on wood ties and elsewhere as
- ORef. Plan No. 900 for additional guard rail
- 3 All materials shall conform to requirements of the Book of Standard Track Haterial/Construction Specs. the Book of Standard Trackwork Plans and the Transit Design Standards Manual.
- @Material to be ASTM A-36 steel unless otherwise specified. Brand guard rail plates to indicate producer and year produced. Guard rail plate assemblies every other tie unless directed otherwise.



RESILIENTLY PASTENED BRIDGE GUARD

Mgr. Track Engineering

- 3/4"

Director-M.O.W.

